Good Morning

Management Review of Occupational Safety and Health (OSH), Environmental (E) and Self Assessment (SA) Management Systems

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Collider-Accelerator Department
September 14, 2005

Brookhaven Science Associates
U.S. Department of Energy

BROOKHAVEN NATIONAL LABORATORY

Purpose

- Annually senior C-A management shall review its environmental and occupational safety and health performance, both qualitatively and quantitatively, for the purpose of identifying key improvement opportunities in these management systems

- C-A managers shall conduct an annual review of organizational performance versus objectives and measures defined in their self-assessment program

Management Review Agenda

- Ed Lessard (Introduction)
- Joe Falco (Industrial Medicine Issues)
- Ed Lessard (Performance on Objectives and Targets, Costs)
- Dave Passarello (Results of Audits and Self Assessment)
- Ray Karol (Injuries, Tier 1, Self-Evaluation, Stakeholder Concerns, Improvements, Initiatives)
- Mel Van Essendelft (Environmental Performance, Groundwater)
- Joel Scott (Waste Management Performance)
- Paul Bergh (Radiological Performance)
- Senior Managers and Others (Senior Manager Evaluation)

Introduction
FY05 Contract Critical Outcome

1.0 Science and Technology

- BNL will deliver innovative, forefront science and technology aligned with DOE strategic goals in a safe, environmentally sound, and efficient manner, and will conceive, design, construct, and operate world-class user facilities.

FY05 Contract Objectives

Objective 1.1 Quality of Science and Technology

- Produce high quality, innovative results

Objective 1.2 Relevance to DOE Mission

- Align with and advance DOE missions

Objective 1.3 Success in Constructing and Operating Facilities

- Ensure effective, efficient, safe and secure operations

Objective 1.4 Research Program Management

- Provide effective customer relationship and program management

FY05 Contract Objective

Objective 3.4 Improved ESH&Q

- BSA will exhibit a commitment to best-in-class performance

FY05 Contract Objectives

3.4.1.1 Days Away, Restricted, or Transferred Rate

- BSA will use a DART = 0.50 as the target

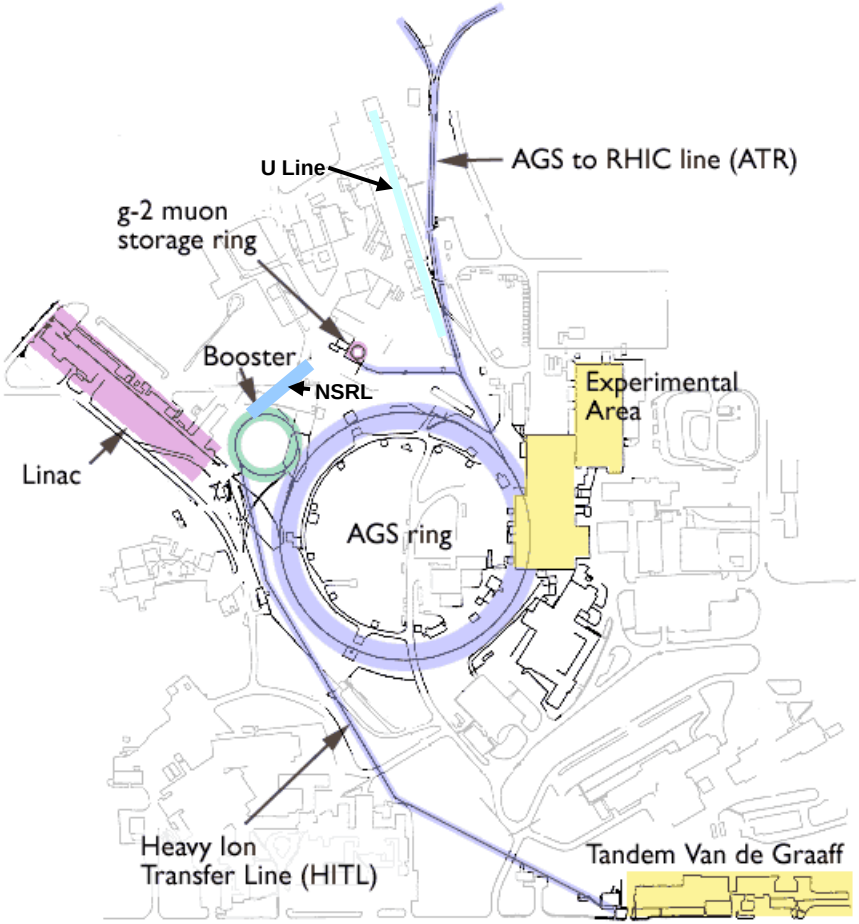
3.4.1.2 Total Recordable Case Rate

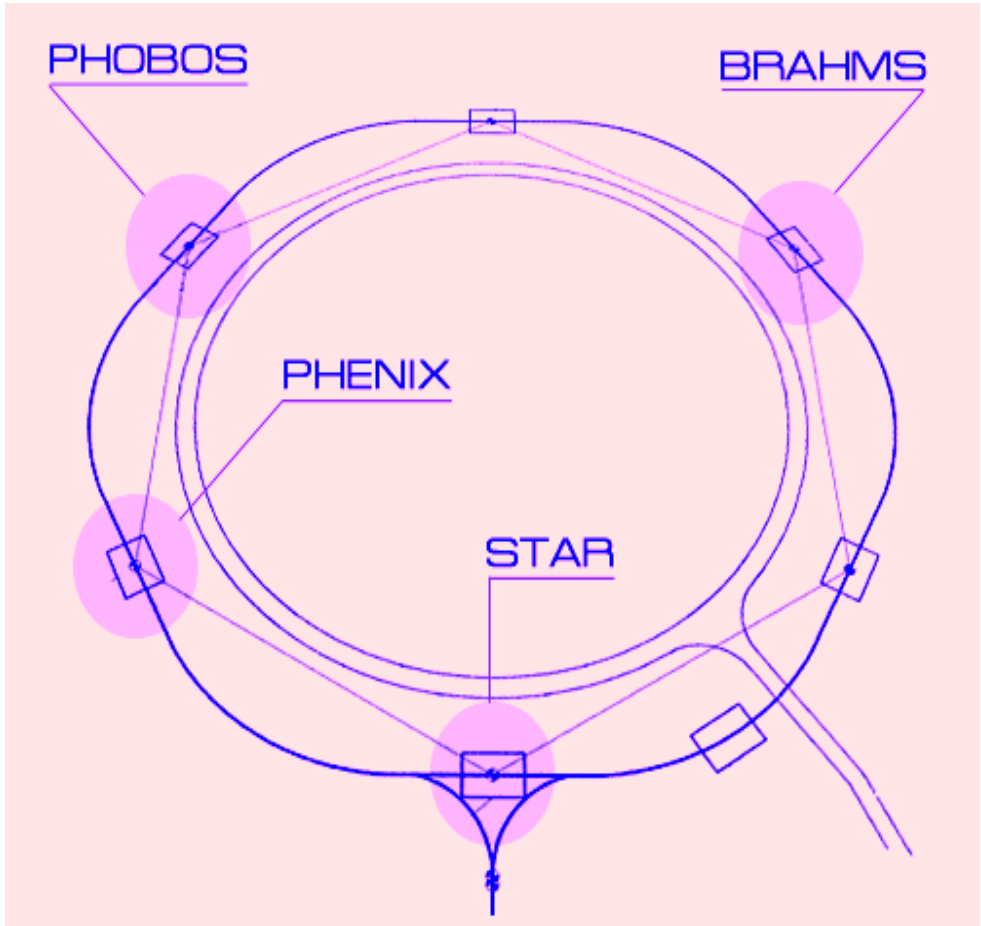
- SC has established a goal TRC rate = 1.10

C-A Department Mission

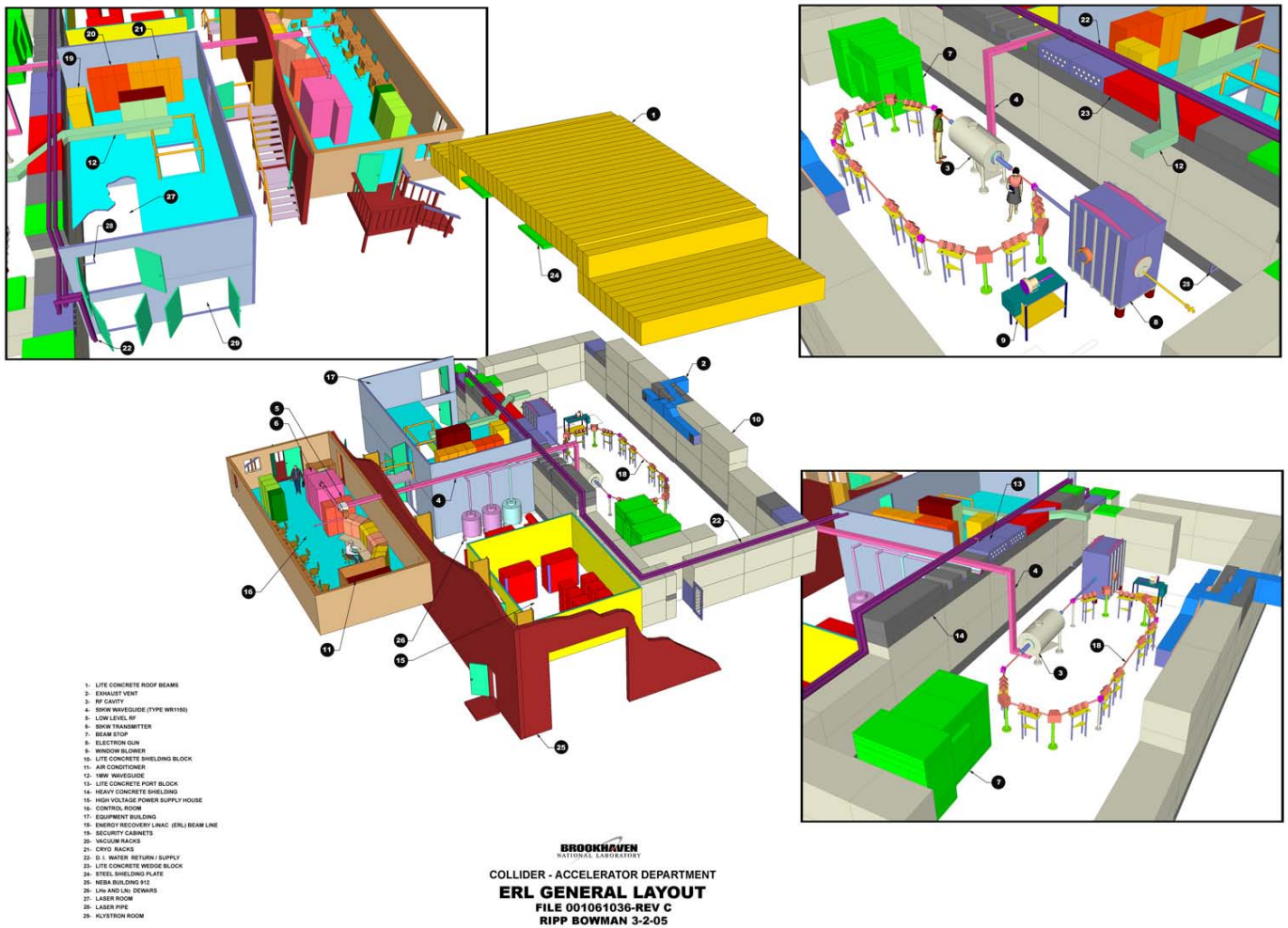
- Mission
  - Develop, improve and operate ion accelerators
  - Support the experimental program
  - Design and construct new accelerator facilities
  - Excellence in environmental responsibility and safety

C-A Department Facilities

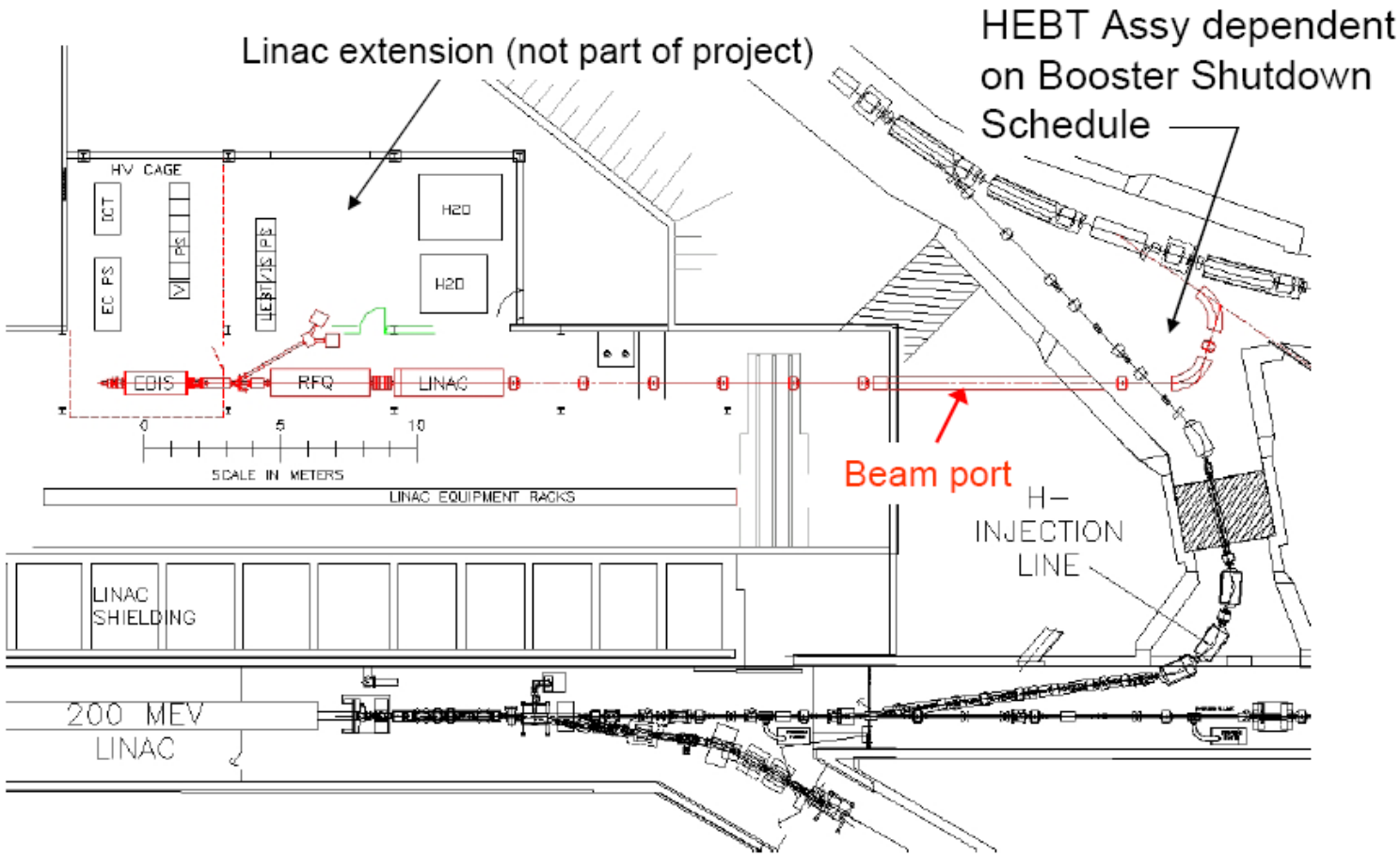




Energy Recovery Linac in Building 912



Electron Beam Ion Source at Building 930



C-A Department Demographics

Category	FY03	FY04	FY05
Scientific	48	49	48
Postdoctoral Fellows	2	6	3
Professionals	158	144	130
Technical	227	196	185
Administrative	25	24	21
Users	1528	1348	1646
Others (Students)	11	8	5
Total	1999	1775	2038
C-AD Employee Total	460	419	387

Joseph Falco, M.D., Manager, OMC

C-AD OSH, EMS and Self-Assessment Management Review
Sept 14, 2005

Warm-up act

- **Condensed matter**
- **Sub-relativistic speeds**
- **Accelerating at safe rates**
- **Not colliding (if we can help it)**

- **Please nudge your neighbor if you hear snoring**

September 14, 2005

Joseph Falco, M.D., Manager, OMC

C-AD OSH, EMS and Self-Assessment Management Review

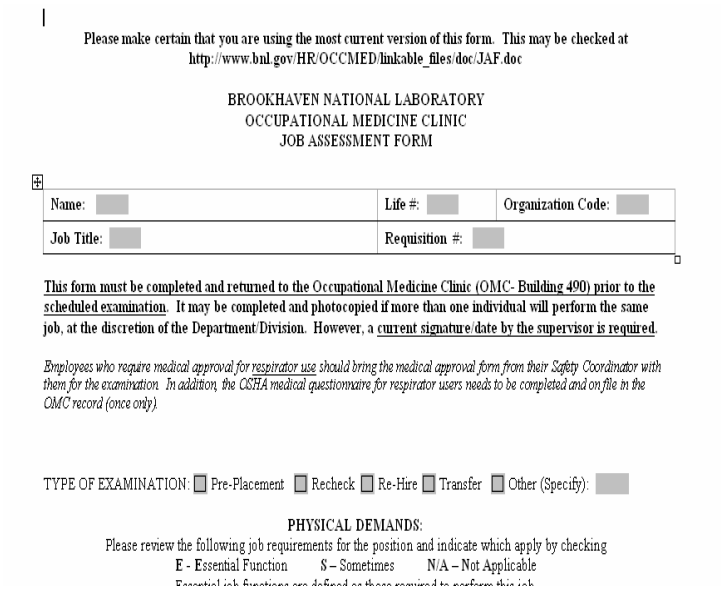
1 Planned Change in OMC Services

2 Case Reports

September 14, 2005

Planned Change in OMC Services

- Change in:
- How and when line organizations submit Job Assessment Forms (JAFs) to OMC
- How recheck (periodic) exams are scheduled



Please make certain that you are using the most current version of this form. This may be checked at http://www.bnl.gov/HR/OCCMED/linkable_files/doc/JAF.doc

BROOKHAVEN NATIONAL LABORATORY
OCCUPATIONAL MEDICINE CLINIC
JOB ASSESSMENT FORM

Name:	Life #:	Organization Code:
Job Title:	Requisition #:	

This form must be completed and returned to the Occupational Medicine Clinic (OMC- Building 490) prior to the scheduled examination. It may be completed and photocopied if more than one individual will perform the same job, at the discretion of the Department/Division. However, a current signature/date by the supervisor is required.

Employees who require medical approval for respirator use should bring the medical approval form from their Safety Coordinator with them for the examination. In addition, the OSHA medical questionnaire for respirator users needs to be completed and on file in the OMC record (once only).

TYPE OF EXAMINATION: Pre-Placement Recheck Re-Hire Transfer Other (Specify):

PHYSICAL DEMANDS:
Please review the following job requirements for the position and indicate which apply by checking
E - Essential Function S – Sometimes N/A – Not Applicable

JAF—satisfies regulatory requirement that OMC receive job info from Line org.

DOE O 440.1A Worker Protection Management for DOE Federal and Contractor Employees CRD– Occupational Medicine sect.:

(1) Occupational medical physicians and selected medical staff shall: … (c) Perform targeted examinations based on an up-to-date knowledge of work site risk;

(2) Contractor management shall provide to the physician responsible for delivery of medical services: (a) Employee job task and hazard analysis information; (b) Summaries of potential worksite exposures of employees prior to mandatory health examinations;

How and when does OMC currently get the JAF ?

Current Process

1. When employee's recheck exam is due (12-18 months after last exam), employee receives notice from OMC that exam is due along with a blank JAF form
2. Employee must give JAF to supervisor and ES&H Coordinator for completion and signature
3. Employee must then submit JAF to OMC and schedules exam

Problem: OMC never receives JAF if employee does not submit it to supvsr & ES&H coord. for completion and then to OMC in conjunction with scheduling an exam

Why is it a problem if OMC doesn't receive a current JAF for each employee?

1. An exam cannot be scheduled until a JAF is received by OMC.
2. OMC uses the JAF (and AMS) form to determine if an employee's exam is required, according to OSHA or DOE regulation, based upon
   - work requirements (respirator, HAZWOPER, riggers, forklift operators)
   - Hazards (noise, lead, bloodborne pathogens, etc.)

How big is this problem ?

Recent audit showed that lab-wide:

- 758 employees have not submitted JAF's in response to notice that physical is due
- Of these, 533 are > 1 year overdue

Among employees who have not had a recent exam and who have not recently submitted a JAF

OMC has, by chance, become aware of employees delinquent for mandatory exams for work that requires medical surveillance/certification exam under:

- 29CFR1910.120 OSHA HAZWOPER
- 29CFR1910.134 OSHA Respiratory Protection
- DOE-STD-1090-2004 DOE Hoisting and Rigging
  - Riggers
  - Forklift Operators

Proposed fix– universal, annual JAF submission for all employees

1. On an annual basis, each Div./Dept. would be required to submit to OMC an updated JAF for *each* of its employees
2. Upon receipt and review of JAF, OMC would contact employee to schedule an exam

Advantages:

- Complete, timely ascertainment of exam requirements for everyone on site
- At the time the employee is contacted by OMC to schedule an exam, the employee is informed by OMC as to whether the exam is mandatory or voluntary

(Some details to be worked out—considering survey comments)

One more issue– the 5 day absence rule

DOE Order 440.1A Worker Protection Mgt for DOE Contractor Employees– Occ Med section of Contractor Requirements Document (Chap 19).

e.(2) Contractor management shall notify the physician responsible for the delivery of medical services or his or her designee when an employee

- has been absent because of an injury or illness for more than 5 consecutive workdays or
- experiences excessive absenteeism.

Also:

d.(3)(e): OMC performs return to work evaluations

In other words…

OMC must be notified when an employee returns to work after an absence of 5 or more days and must perform a return to work evaluation

- Therefore, OMC requests that returning employee be directed by their supervisor to OMC for a Back-to-Work clearance:
- Reasons
  - Compliance with 440.1A requirements
  - Confirming absence medically justified
  - Assuring employee fit for back to work
  - Assist employee with return to work– any special needs or restrictions
  - Reporting requirement to DOE Health Surveillance System—wants 5 day back-to-work data (de-identified)

CASE REPORTS

Case Report #1– A technician with a painful right arm

A technician in his 40's presents with one month of right-sided hand/arm symptoms:

- Forearm pain
- Numbness in the 1st 3 fingers
- Weak grasp

Recent work activities

Intensive work prior 4 months involving:

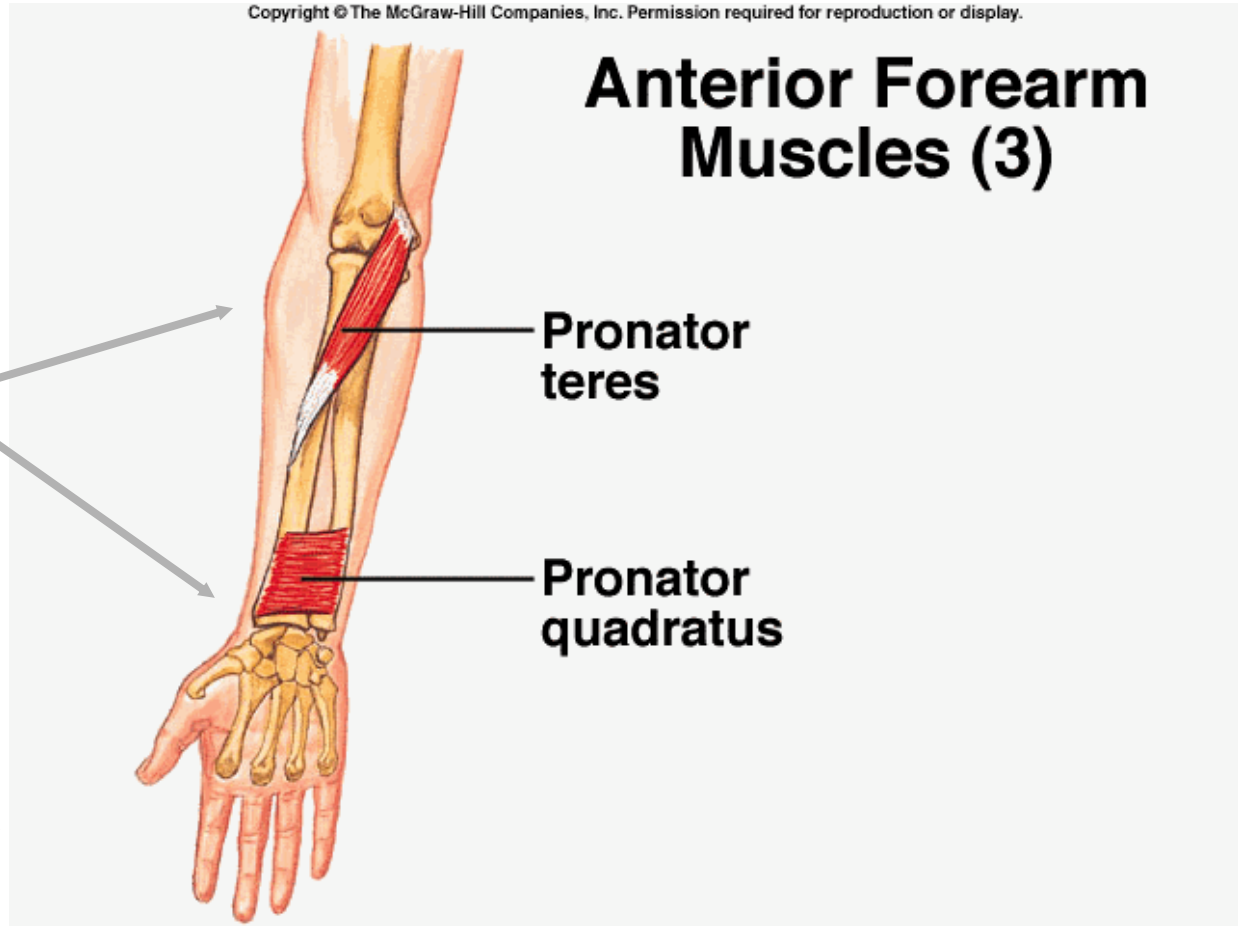
- Lots of hand tools– crimpers, wire strippers, tie wrap gun, wrenches
- Cables– pulling, moving into position

Work-up reveals

- Carpal tunnel syndrome
- “Pronator teres syndrome”

Note:

- Double-entrapment of median nerve
- Pronator -- twisting motions



Subsequent course

- Carpal tunnel release surgery
- Splinting
- Several months of rehabilitation, lost work, restricted duty

Lessons

- Relatively short periods of intensive, repetitive activities can result in serious injury
- Cable pulling and wire manipulations (crimping, stripping, twisting) can stress the forearm if a lot of sustained, repetitive tasks

Prevention—not rocket science (or high energy physics)

- Admin. Controls– Job rotation, job enlargement, frequent rest breaks (at least 5 min/hr.)
- Ergonomic controls– design job to minimize force and repetition, avoid awkward postures, temp. extremes
- Ergonomic tools
- Encourage early reporting of symptoms
- Ergo. Evals, if indicated
- Care when placing workers into jobs featuring these types of

Good news

- Preceding case occurred in 2002
- No serious cable pulling repetitive strain injuries since then.

Case Report #2– MYSTERY. Case of a technician sensitized to beryllium

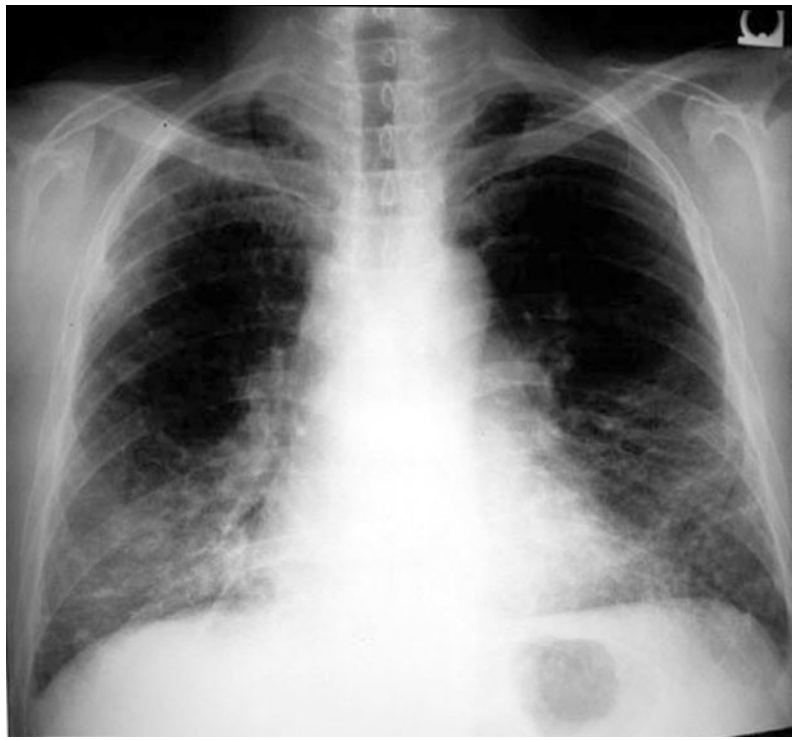
A vacuum technician in his 60's who worked briefly with beryllium in 1999 was offered beryllium medical surveillance in accordance with the DOE Beryllium rule: 10CFR850

Medical surveillance results:

- No evidence of chronic beryllium disease (scarring lung disease assoc. w/ beryllium exposure)….but….
- An unexpected finding– worker found to be sensitized to beryllium

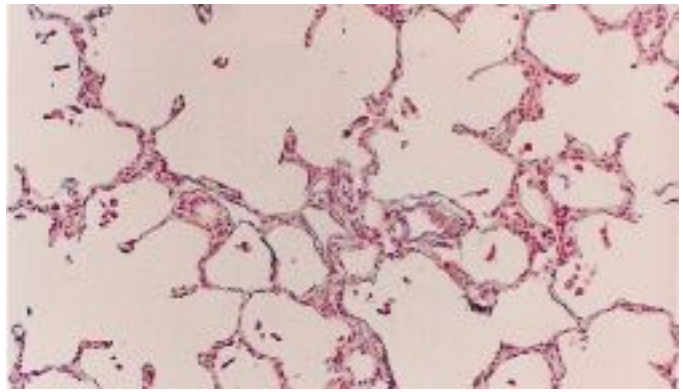
Background

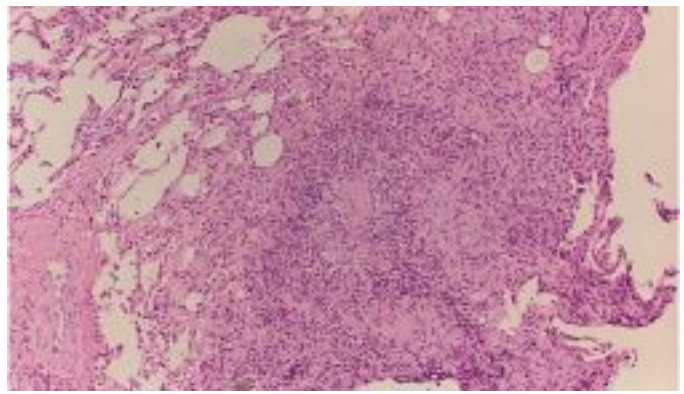
- Beryllium—light metal (atom wt. 9) used in nuclear industry due to properties, incl. transparency to neutrons
  - Beam tubes in RHIC detectors made of Be
- In 1940's, scarring lung disease began to appear in beryllium workers:
- Berylliois or Chronic Beryllium Disease (CBD)



Biology of Chronic Beryllium Disease (CBD)

- Small inhaled beryllium particles deposit in lungs
- Worker's lymphocytes becomes sensitized to beryllium
- Sensitized lymphocytes infiltrate lung and set up scar reaction—granuloma--CBD
- Can cause respiratory compromise





Detecting Beryllium sensitization—use of a blood test

- Beryllium lymphocyte proliferation test– BeLPT
  - Live lymphocytes isolated from whole blood and incubated with beryllium salt for 4-7 days
    - Sensitized person's lymphocytes begin to proliferate
    - Non-sensitized person's do not
  - Most patients with CBD score (+) on the BeLPT
  - Some Be-exposed workers score (+) on BeLPT even absent evidence of CBD
    - Some will eventually develop CBD (10% / year)
    - Some may never-- Lung burden of Be too low ?

Only certain individuals are susceptible to Be sensitization and CBD

- In populations of workers heavily exposed to Be
  - 10% or less are sensitized
  - 5% or less have CBD
- Genetic predisposition
  - Most individuals with CBD & Be sensitization have a specific mutation in a human histocompatibility gene– HLA DP-1
    - Codes for protein expressed on lymphocytes
    - Class of genes/proteins used for transplant tissue typing
    - Determines what lymphocyte perceives as “self” vs. “foreign”

Is there a safe exposure level for all workers ?

- Occupational epidemiologic studies suggest that sensitization and CBD do not occur at exposures $\leq$ 0.1 ug/m^3 8 Hr TWA
  - Action Level of DOE Be Standard 10CFR850 is 0.2 ug/m^3

Case presentation: Did technician have any BNL Be exposures sufficient to cause sensitization ?

Exposure History: Employed at BNL 12 years

- 1998-1999: Installation of beryllium tubes in RHIC detectors
  - Negative wipe tests on outside of tubes
  - Gloves worn when handling
  - Air monitoring < .113 ug/m^3 8 hr. TWA
  - No manipulation of tubes other than bolting of some (worker says not involved in this)
- Other potential BNL exposure—worked at BLIP in vicinity to operation where end caps welded onto Be tubes

Any other co-workers sensitized ?

Additional Be-LPT Testing at BNL

- 2005– 7 other workers tested (incl. 2 doing same Be tasks as technician)—**all negative**
- 2001—3 workers tested—**all negative**
- 2001-2002– 16 *former workers* tested (by ORISE)—all negative

Any other explanation ?

- No known environmental beryllium exposure (e.g.; residence near Be manufacturing facility)
- Prior work 1976-1992 as auto mechanic
  - Beryllium is used in automotive industry (e.g.; heat sink for ignition systems) --? association

Mystery solved ?

- No !!!!!!!!!!!!!
  - Seems implausible that Be exposures at BNL sufficient to have caused sensitization, even if assume genetically predisposed
  - Possible association with prior auto mechanic work if manipulated any Be-containing parts
  - It is encouraging that technician has not developed CBD, even though relevant exposures likely years ago
    - Lung burden of beryllium likely very low
- Case illustrates difficulties in deciding what are clinically relevant Be exposure levels.

Ed Lessard

- OSH and E management systems
- Questions answered:

  What was the performance on the FY04 Record of Decision?
  What are the FY05 objectives and targets?
  What was the performance on FY05 objectives and targets?
  What are the OSH and E costs?

Summary of Last Year's Management Review Decisions and Performance

- ✓ Continue to replace PCB capacitors (3800)
- ✓ Continue to remove legacy waste from C-AD (912)
- ✓ Continue the tritiated cooling-water system upgrades (3)
- ✓ Complete the archival mapping of activated soil areas (40)
- ✓ Perform more ergonomic reviews in work areas (7)
- ✓ Continue to promote the repair of the Building 912 roof (1)

Summary of Last Year's Management Review Decisions and Performance

- ✓ Improve material handling programs (750 7 20)
- ✓ Continue to increase awareness of injuries (5)
- ✓ Improve the fall-protection program (29CFR1910)
- ✓ Develop a system to capture PPE costs (3)
- ✓ Develop a Job Risk Assessment for demolition
- ✓ Continue to streamline management systems (3→1)

Summary of Last Year's Management Review Decisions and Performance

- ✓ Continue to place caps over activated soil (100%)
- ✓ Continue to increase worker involvement (350)
- ✓ Implement more effective housekeeping programs (1.7 912 901)
- ✓ Renew emphasis on fire protection upgrades (907 911 911 912)
- ✓ Prevent repetitive Tier 1 violations (500→200)
- ✓ Implement the soil coupon program (6)

Summary of Last Year's Management Review Decisions and Performance

Encourage BNL to:

- ✓ Expand OHSAS 18001 Lab-wide (II)
- ✓ Increase ESHQ staff productivity (7→1)
- ✓ Implement ESH review of purchased items (101)
- ✓ Implement an electrical equipment acceptance program
- ✓ Streamline lab-level safety reviews by Committees (2)
- ✓ Provide lab-wide summaries of injury and illness statistics
- ✓ Align ISO 14001/OHSAS 18001 audits with June time frame
- ✓ Improve outside analytical labs services (3)

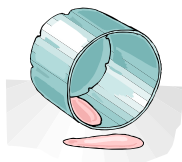
FY05 Environmental Management Objectives

- ✓ Maintain Environmental Management System
- ✓ Achieve Compliance
- ✓ Expand Pollution Prevention
- ✓ Improve Communications
- ✓ Protect Groundwater
- ✓ Enhance Natural And Cultural Resources

FY05 Environmental Management Targets and Performance

Maintain Environmental Management System:

- ✓ Review EMS audits, compliance assessments, and management reviews
- ✓ Communicate EMS improvement suggestions to the EMS manager
- ✓ Submit EMS Audit Planning Form to EMS Manager
- ✓ EMS Reps take the three EMS training courses, TQ-EMS-1, 2, 3
- ✓ Provide 1 targeted EMS Awareness initiative at staff level



FY05 Environmental Management Targets and Performance

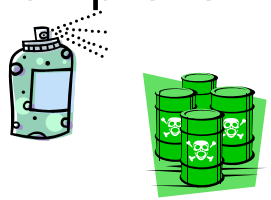
Achieve Compliance:

- ✓ Obtain approval from EWMSD for discharges not specifically authorized by Liquid Effluents subject area
- ✓ Ensure conformance with *Storage and Transfer of Hazardous and Nonhazardous Materials*
- ✓ Maintain all outdoor Article 12 registered tanks and storage areas with weather resistant labels
- ✓ Review the list of Satellite Accumulation Areas (SAA's) and Radioactive Waste Accumulation Areas
- ✓ Set a goal of zero violations in SAA's and Radioactive Accumulation Areas; track and trend all violations (0)
- ✓ Complete the waste generation forecast for FY06 and submit to EWMSD
- ✓ Prepare plans to address characterization and disposition of excess materials
- ✓ Close all RCRA findings from the FY04 RCRA Assessment
- ✓ Involve ECR in review of Clean Air Act requirements
- ✓ Conduct an inventory of Ozone Depleting Substances and forward that inventory to EWMSD
- ✓ Participate in the NEPA assessment
- ✓ Participate in the Environmental Monitoring assessment
- ✓ Participate in the planned assessment of Waste Characterization
- ✓ Conduct an inventory of essential vs. non essential mercury
- ✓ Identify suitable replacements for mercury containing devices

FY05 Environmental Management Targets and Performance

Expand Pollution Prevention:

- ✓ Set a Department wide goal on reducing a specific waste (200)
- ✓ Analyze all waste generating activities for pollution prevention
- ✓ Submit pollution prevention project proposals
- ✓ Submit success stories and/or lessons learned
- ✓ Develop a plan for the reduction of PCB containing devices

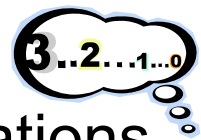


FY05 Environmental Management Targets and Performance

Improve Communications:

✓ Provide environmental updates to CAC & BER

Protect Groundwater:



✓ Zero impacts on groundwater quality from operations

Enhance Natural And Cultural Resources:

✓ Support requirements for use of native vegetation

FY05 Occupational Safety and Health Objectives

- ✓ Improve Material Handling Programs
- ✓ Streamline ESHQ Management Systems
- ✓ Reduce Injury Rates (↓100 and 200%)
- ✓ Comply With Requirements
- ✓ Renew Emphasis On Fire Hazards Analysis
- ✓ Improve Electrical Safety Programs (70E)

FY05 Occupational Safety and Health Targets and Performance

Improve Material Handling Programs:

- ✓ Develop manual-lifting guidelines to reduce overexertion injuries
- ✓ Ensure hoisting and rigging are performed by qualified personnel
- ✓ Increase awareness of injuries related to overexertion, slips, falls, bodily reaction, and repetitive motion
- ✓ Continue to increase worker involvement in the occupational safety and health programs
- ✓ Implement more effective housekeeping programs in work areas

FY05 Occupational Safety and Health Targets and Performance

Streamline Management Systems:

- ✓ Be prepared for OHSAS 18001 re-registration by 6/05
- ✓ Encourage the Laboratory to expand the risk-based OHSAS 18001 Lab-wide
- ✓ Encourage the Laboratory and the Department to increase ESHQ staff productivity by eliminating low-value added ESHQ programs
- ✓ Reduce the number and frequency of low value-added audits and audit questionnaires
- ✓ Investigate the use of better outside analytical labs for improved service to BNL

FY05 Occupational Safety and Health Targets and Performance

Reduce Injury Rates:

- ✓ Maintain C-AD DART < 0.5 and TRC <1.10 (↑10 and 20%)
- ✓ Reduce number of first aid cases by 10% from FY04 number (4→1)
- ✓ Focus the staff to work on eliminating causes of injuries being experienced (18001)
- ✓ Encourage the Laboratory to make injury reports available
- ✓ Change time frame for NSF registrations
- ✓ Perform more ergonomic reviews in work areas
- ✓ Continue to promote the repair of the Building 912 roof
- ✓ Establish a liaison between C-AD/SMD and OMC
- ✓ Improve the fall-protection program
- ✓ Develop a system to identify and capture personal protective equipment costs
- ✓ Work with the WOSH Committee to prevent repetitive OSHA violations

FY05 Occupational Safety and Health Targets and Performance

Compliance With Requirements:

- ✓ Minimize findings in QA Assessments of OSH topics
- ✓ Update Job Risk Analyses (29)
- ✓ Update Facility and Area Risk Analyses (29)
- ✓ Increase the number of Building Managers trained in OHSA regulations
- ✓ Close out WOSH Committee issues within 90 days
- ✓ Close out Tier 1 issues within designated times
- ✓ Improve the OSH records filing system
- ✓ Meet BNL requirements on closure of OSHA findings
- ✓ Maintain staff training > 95% complete

FY05 Occupational Safety and Health Targets and Performance

Improve Electrical Safety Programs:

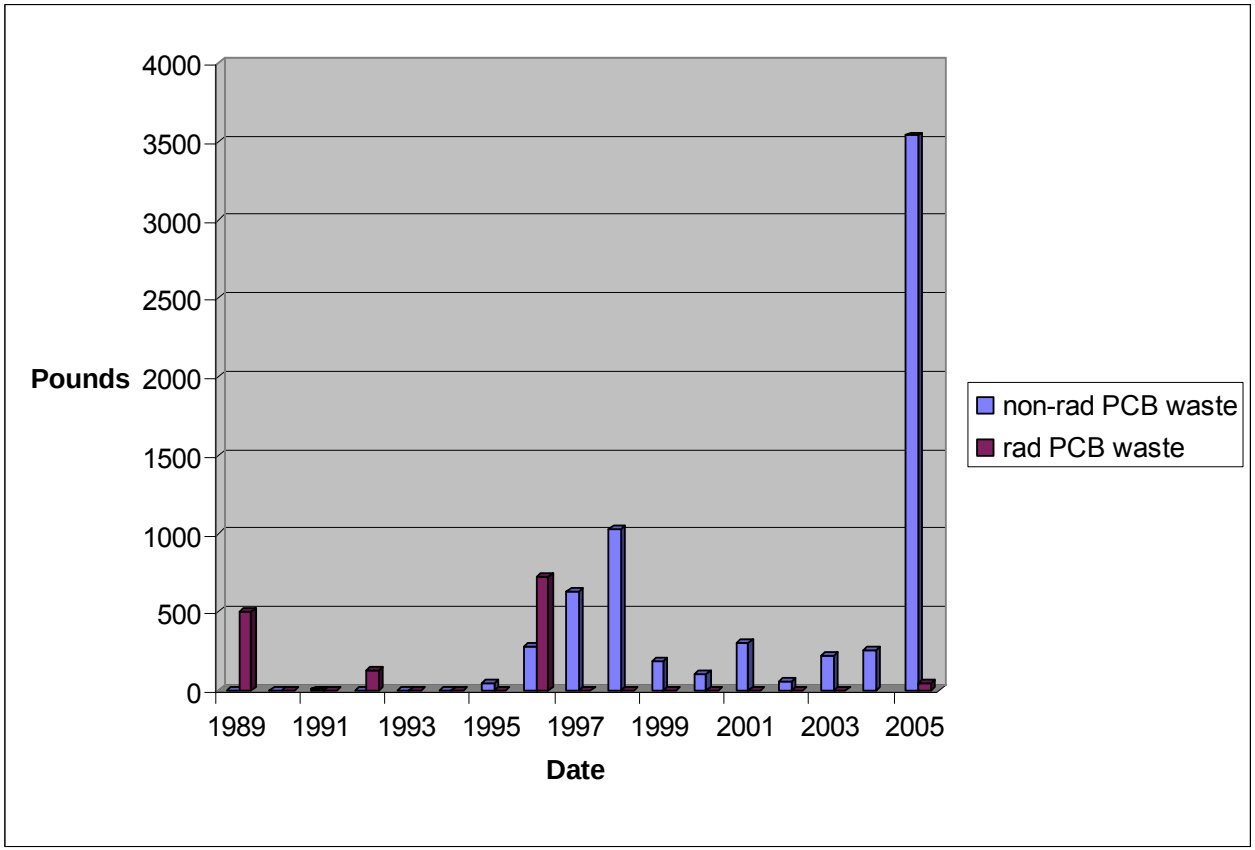
- ✓ Implement NFPA 70E PPE requirements (150)
- ✓ Implement NRTL requirements (8 10 600-700 5y)

FY05 Occupational Safety and Health Targets and Performance

Renew Emphasis On Fire Hazards Analysis:

- ✓ Restart the stalled Fire Hazards Analysis program

PCB Reduction



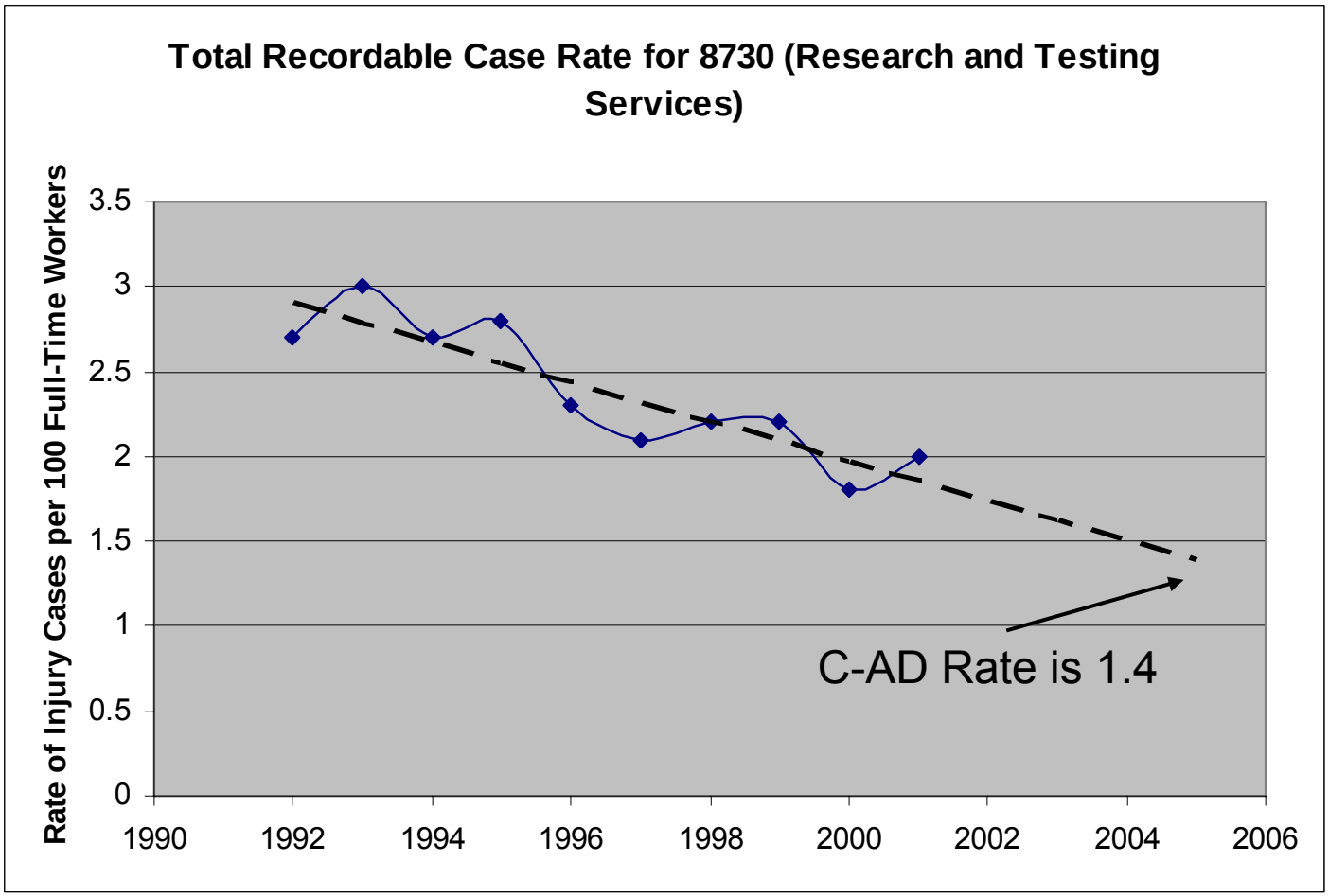
CA-D Occupational Injuries in FY05

- 1 First Aid Case
- 4 Athletic/Recreation
- 2 DART Cases
- 5 TRC Cases

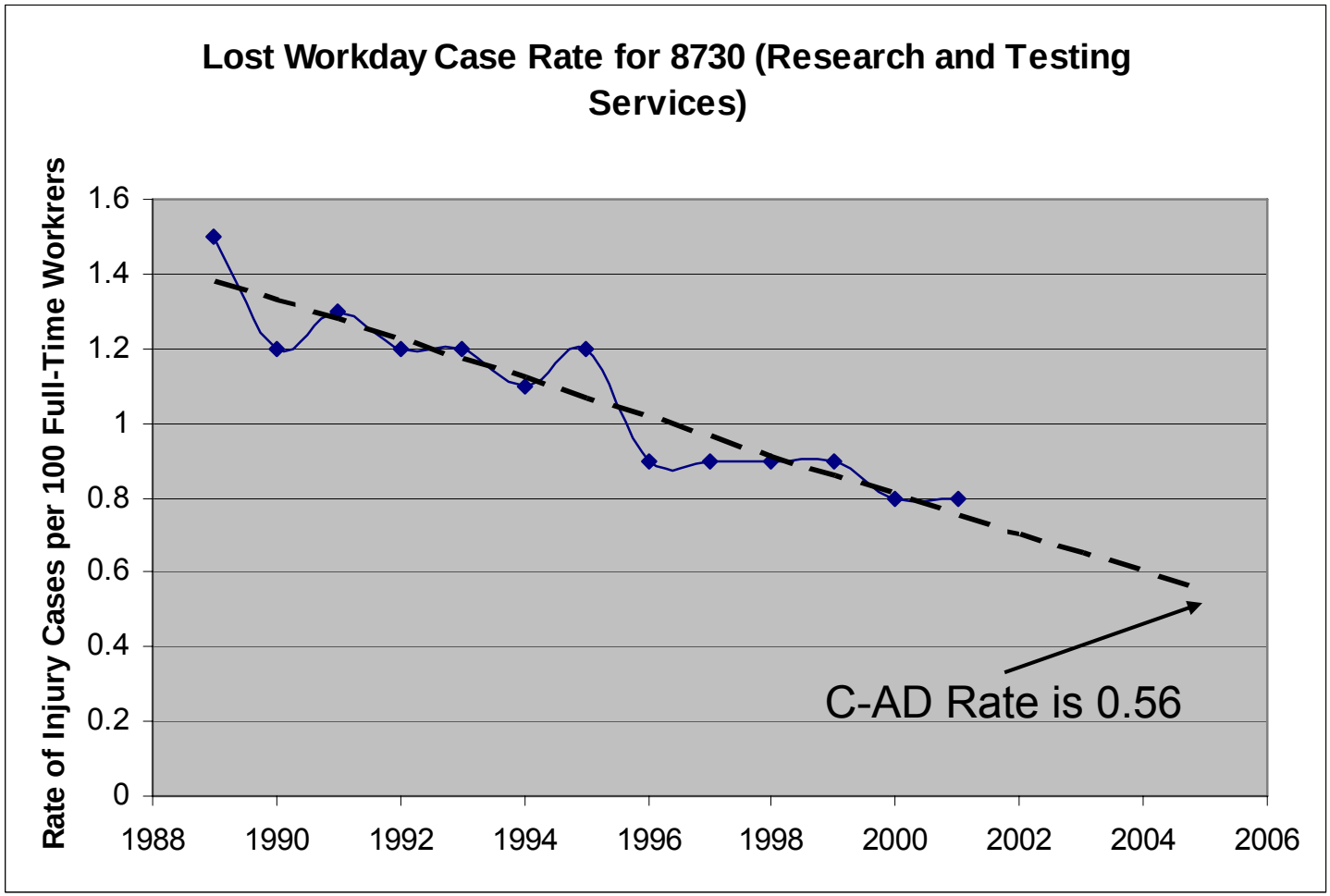
- C-AD DART Rate = 0.56
- C-AD TRC Rate= 1.4

- FY05 BSA Contract Goals
  - Maintain DART Rate < 0.5
  - Maintain TRC Rate < 1.1

Department of Labor Injury / Illness Trend

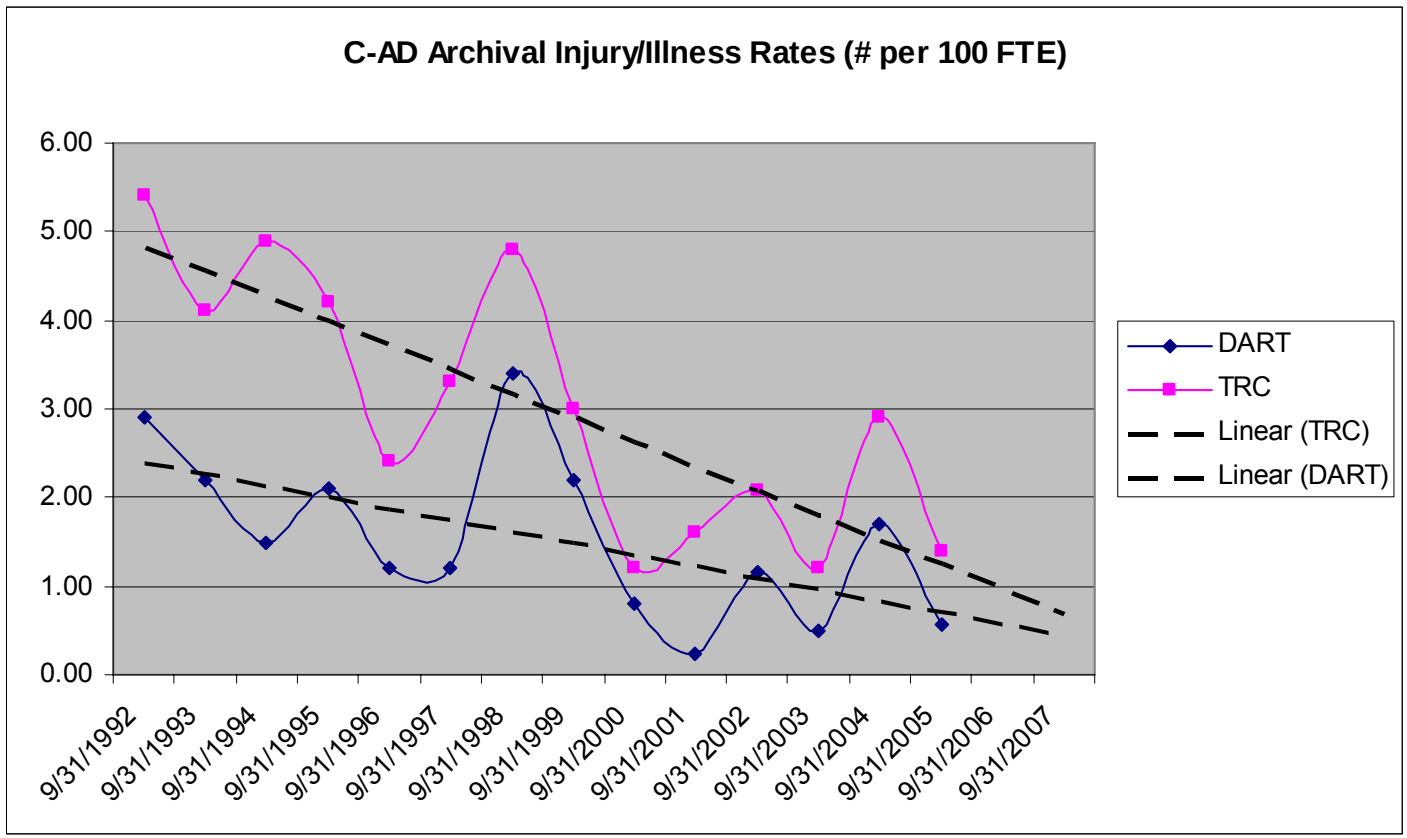


Department of Labor Injury / Illness Trend



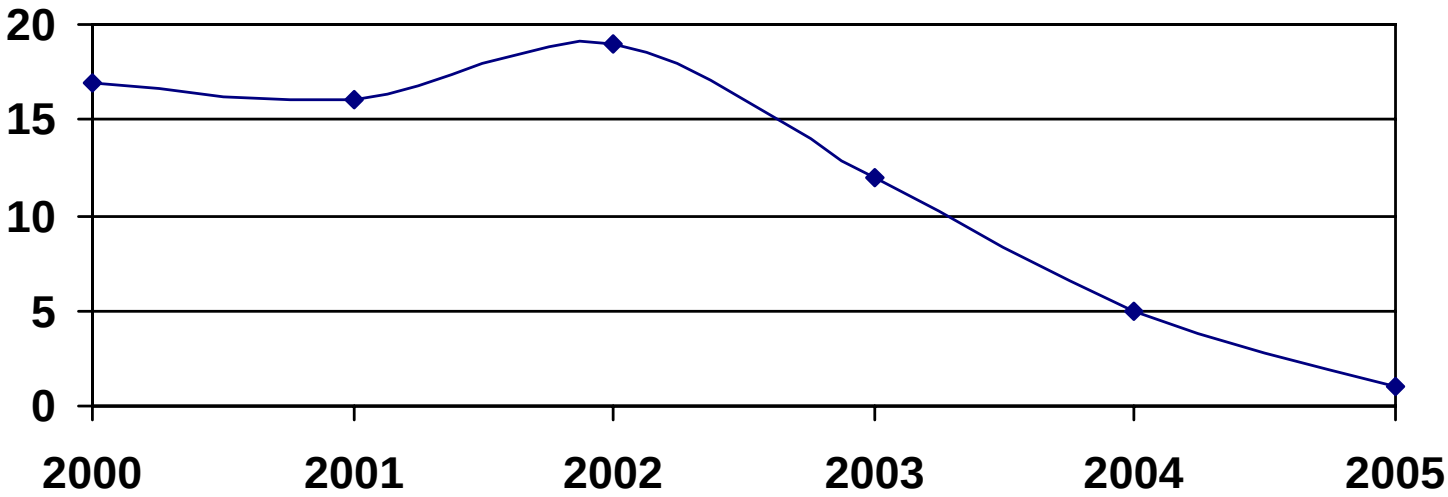
FY06 BSA/BNL Contract Agreement

- FY06 DOE Expectation: DART <0.35
- FY06 DOE Expectation: TRC <0.87

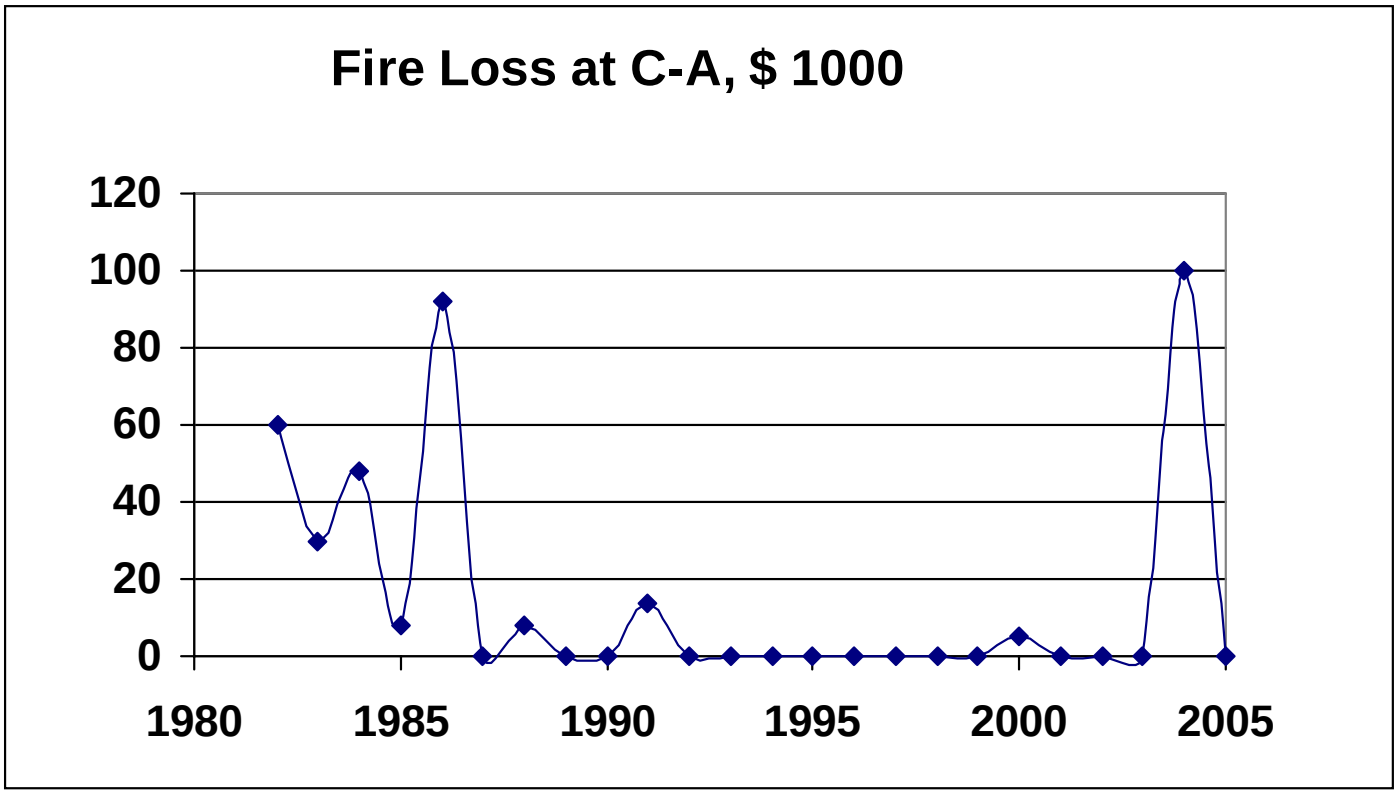


Injury / Illness Trend

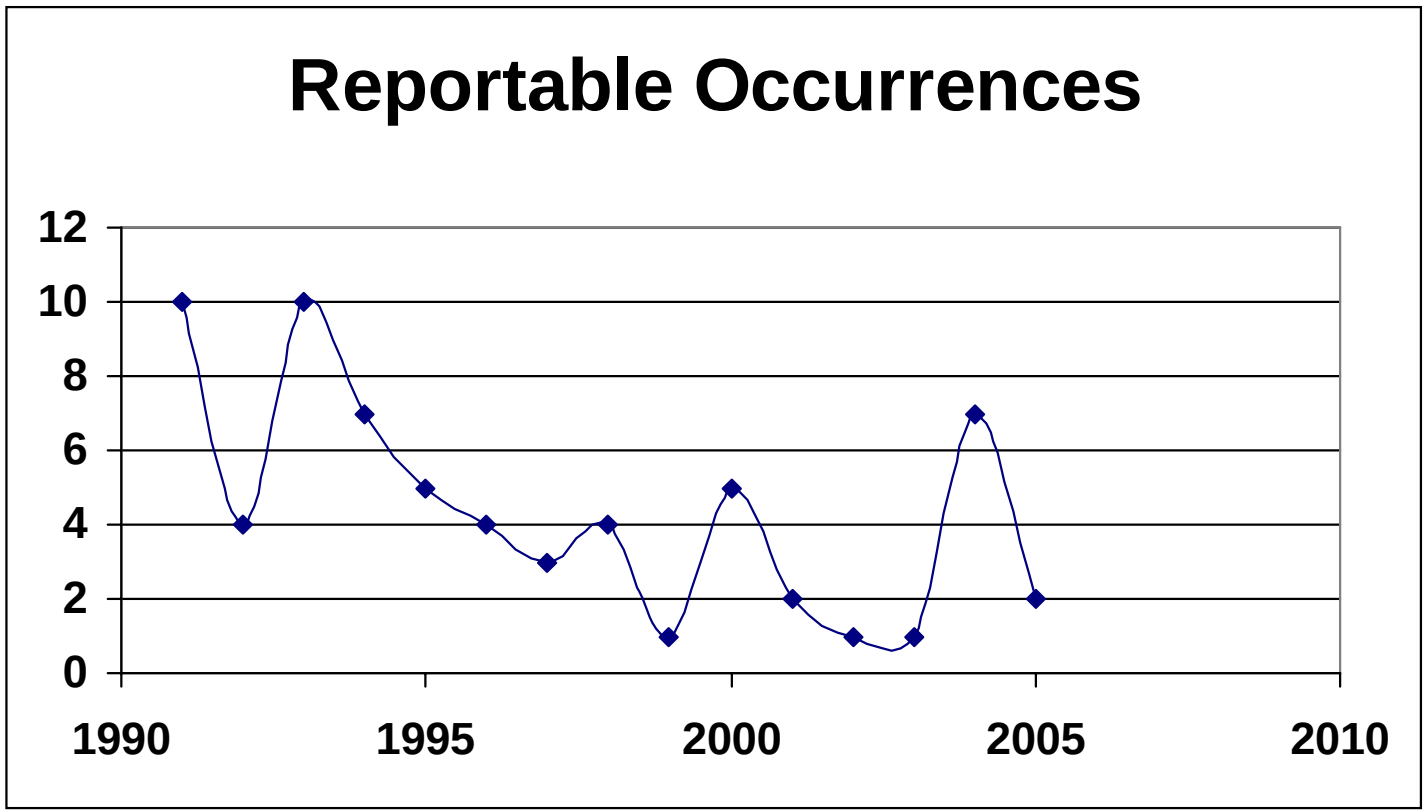
First Aid Cases
Excluding Athletic Injuries



Fire Loss Trend



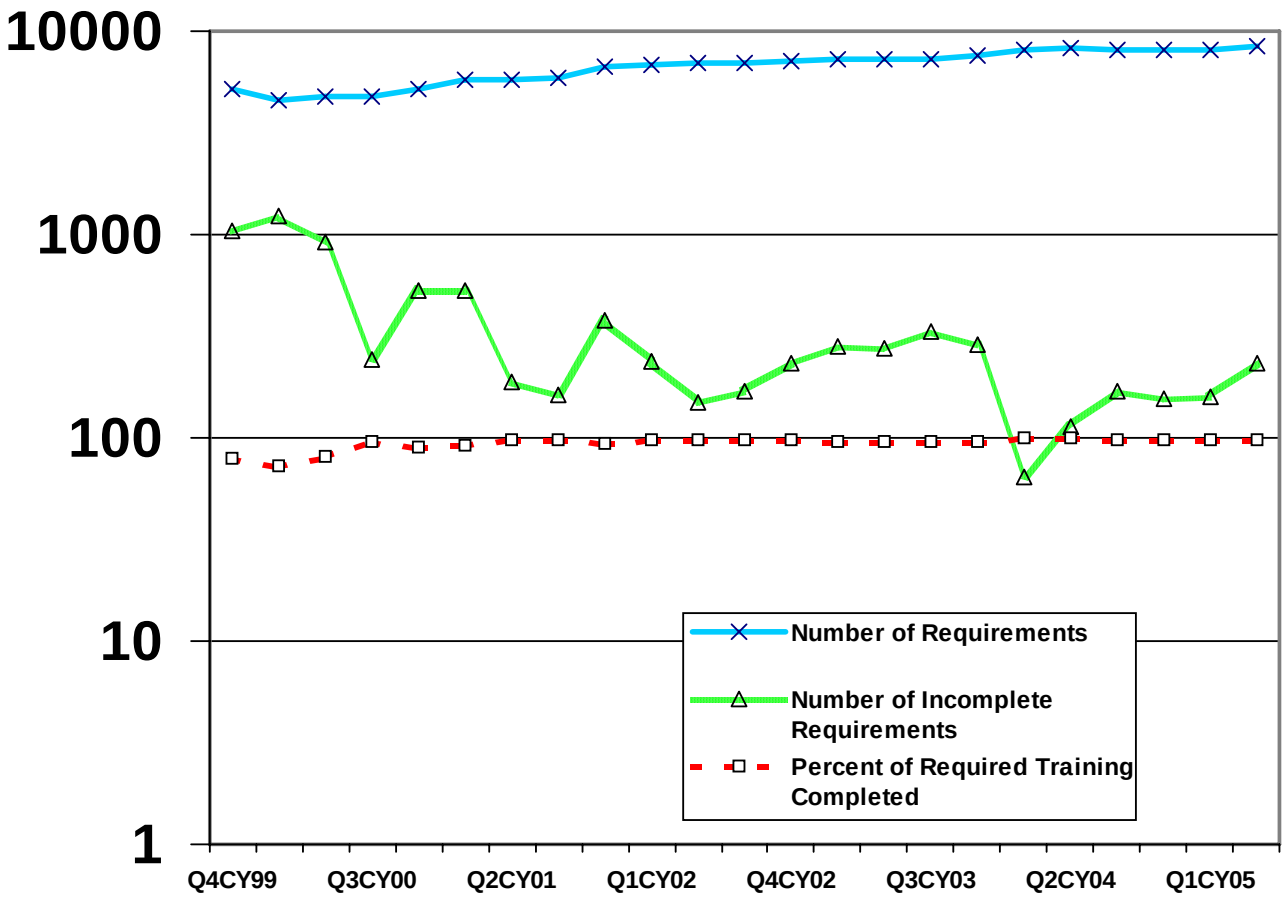
Occurrence Trend



FY05 Occurrences

- C-AD employee slips and falls in her office
- PE employee slips on icy pavement near 913R

C-AD Training Requirements and Completions



FY06 DOE ISM Review

Preparation Review for ISM Review (7 Consultants)

• Scoping Visit	September 29-30
• Data Collection	October 17-28

ISM Review (25 Emergency Management / ESH Inspectors)

• Scoping Visit	February 1-2
• Planning Visit	March 13-17
• Data Collection	March 27-April 7
• Validation and Closeout	April 18-20

10CFR851

- DOE Representative Indicates Imminent
- $70,000 per violation
- Requirements include:
  - OSHA Standards (29CFR1910, 1915, 1917, 1918, 1926, 1928)
  - NFPA Standards
  - ASME Boiler and Pressure Vessel Code (2004)
  - ANSI/ASME Piping Codes
  - ASME Codes for Valves, Fittings, Flanges, Gaskets
  - ASME/API/UL Codes for Heat Exchangers, Compressors, Pumps, Tanks

Dave Passarello

- Assessments
- Questions answered
  - What were the internal assessments about?
  - What were the external assessments about?
  - What are results?
  - How were findings dispositioned?

FY05 Self Assessment Plan

- Objective: systematic approach to management
  - Plan identifies EMS/OSHA/QA performance objectives
  - Assessment ensures improvement actions are implemented

FY05 Self Assessment Metrics

Criteria 1 Leadership Commitment and Involvement
Objective: Excellence in environmental responsibility and safety

Criteria 2 Human Resource Development and Management
Objective: Train, empower, motivate C-A employees

Criteria 3 Customer Focus and Satisfaction (Customer Value)
Objective: Be responsive to internal and external customer expectations

Criteria 4 Process Management
Objective: Establish, maintain and improve process/procedures

FY05 Self Assessment Metrics

Criteria 5 Business and Operational Results

Objectives: Design and construct new accelerator facilities
Operate/improve accelerators and transport lines
Support the experimental program

Criteria 6 Compliance with Requirements

Objective: Comply with applicable requirements.

Internal Assessment for EMS/OSH

Purpose

- Management System elements are in place and implemented

Results

- EMS: 1 Major and 3 minor nonconformances identified & addressed
- OSH: 3 minor nonconformances identified & addressed

Noteworthy practices

- Quarterly review of Tier I findings for noticeable trends
- Aggressive approach for implementing safe work practices
- Ongoing process of cleaning up legacy facilities

Internal Assessment Questionnaires

Required BNL Management System assessments:

- Emergency Preparedness Management System
  - Shelter-in-Place
- Environmental Management System
  - Regulatory Compliance
  - EMS Assessments
  - Management Review
- Worker Safety and Health Management System
  - Lockout/Tagout
  - Interlock Safety for Protection of Personnel

Internal Assessments By C-AD Staff

▪ Critiques (including ad hoc reviews)	17
▪ QA Assessments	12
▪ Tier 1	35
▪ Worker and Supervisor Self-Evaluations	6
▪ Safety Walks	4
▪ Outdoor Storage Areas	4
▪ Inspection of Satellite-Waste Stations	12
▪ Tank Inspections	12
▪ 90-Day Area Inspection	52

FY05 External Assessments

BNL

- Work Control
- Working on or Near Live Electrical Parts
- Self-Assessment Program
- NRTL Listed Equipment
- Electrical Safety Program

NSF

- ISO 14001 surveillance audit
- OHSAS 18001 surveillance audit

FY05 External Assessments

DOE
- Property Audit
- Electrical Work Practice
- ISM Focused Assessment of Work Planning and Control

BHSO Independent Assessments
- Laser Safety Verification

BHSO/BSA Collaborative Assessment
- Machine Guarding

BSA Self-Assessments With BHSO Observation
- Radiological Work Controls (Entry/Exit Controls, Posting & Labeling)
- IH – Respirators
- NEPA
- Environmental Monitoring

Status of Action Items from Assessments, Critiques, Committees and ORPS

- Internal (Family ATS)
  - Issued 343
  - Percent Closed 53%

- External (Institutional ATS)
  - Issued 19
  - Percent Closed 95%

Closeout Process for Action Items

- Actions assigned to accountable individual(s)
- Internal action items entered in Family ATS
- External action items entered in Institutional or Family ATS
- Closeout requires concurrence of ESHQ Management

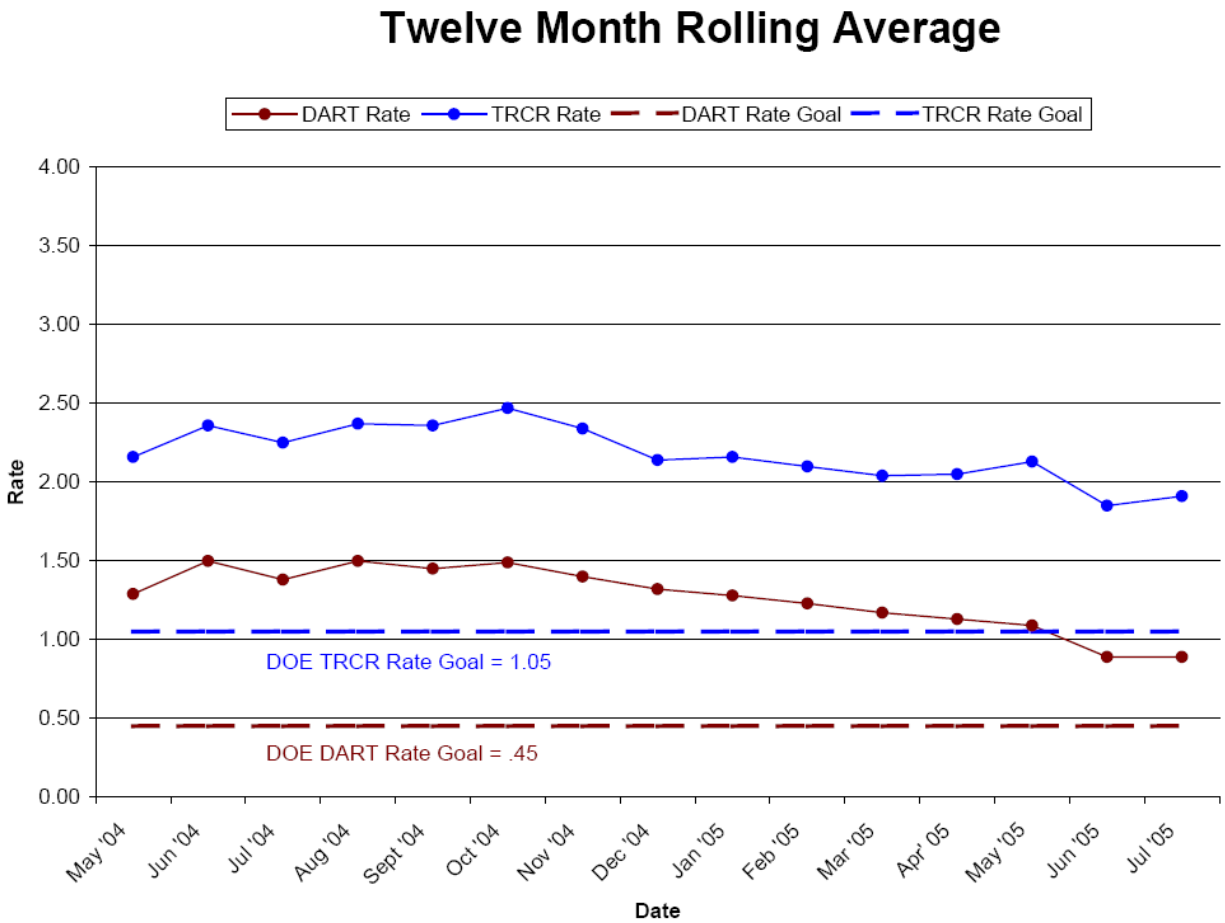
Ray Karol

- Illness/Injury performance
- Tier 1 results
- Self-evaluation program
- Stakeholder concerns
- Major OSH/EMS Improvements
- S2 and P2 initiatives

Occupational Injuries in FY05

Organization	DART Rate per 100 FTE *BNL Goal <0.5*	TRC Rate per 100 FTE *BNL Goal <1.1*
C-AD	***0.56*** 2 cases	***1.4*** 5 cases
PE	***1.8*** 5 cases	***4.3*** 12 cases
BNL	***0.62*** 15 cases	***1.4*** 34 cases

BNL Illness/Injury Statistics



C-AD Days Away Restricted Duty (DART)

2 Cases in FY 05

- Secretary slips in office and breaks tibia
- Metal chip in eye after grinding metal pipe

C-AD Recordable Cases

5 Cases in FY 05

- Broken tibia
- Metal chip in eye
- Slip on ice by loading dock
- Cut thumb on tray while pulling cable
- Splinter in finger while pushing cart

C-AD First Aid Cases

1 First Aid Case in FY 05

- Cut finger while using razor to open box

C-AD Tier 1

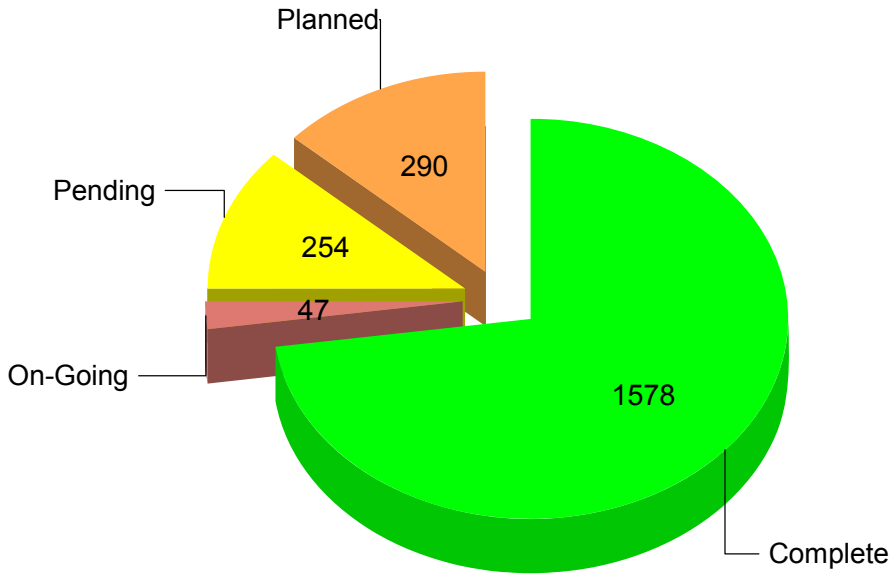
- Tier 1 inspections are similar to OSHA inspections
- Weekly Tier 1 inspections cover over 100 buildings
- Findings tracked in ATS

C-AD Tier 1 Process

- Reports distributed after inspection
- Findings assigned to responsible individual
- 36 Tier 1s conducted in FY05 (to date)

Status of C-A OSHA Corrective Actions

OSHA Abatement Status (Number of Instances)



Complete	1578	72.8%
On-Going	47	2.2%
Pending	254	11.7%
Planned	290	13.4%
Total:	2169	100.0%

C-AD assigned 647

636 – complete

1 – pending

10 planned

C-AD Self-Evaluation Program

- Individuals assess tasks and identify improvements
- Managers, supervisors and technical staff participate
- Program was revised and paired down
  - Six self-evaluations performed in FY05 (to date)
  - Corrective actions tracked in ATS

Safety Walk Program

- Adapted from SNS, started in FY 04
- 5 Safety Walks done in FY05 to date
- Primarily a worker review of the job
- Looks at good and bad practices
- Another method to obtain worker feedback

Stakeholder Concerns

- Community
  - g-2 tritium plume
- Regulators
  - g-2 tritium plume
  - External regulation
- Activists
  - None

Major OSH/EMS Improvements

- Implement NFPA 70E including PPE
- Remote breaker operation to reduce arc flash exposure
- Formalized inspections for cranes, hoists and forklifts
- HSSD in B911B Relay Room
- Major cleanups in TVDG and B912
- Platform additions to RHIC RF cavities
- Platforms/ladders installed at PHENIX shielding
- Paved road to PHENIX gas pad and gas mixing house
- Cable pulling safety procedure
- Return to work policy issued

Major OSH/EMS Improvements

- Working hour limitations policy issued
- Transporting injured/ill workers offsite policy issued
- Reviewed all cold box and valve boxes at RHIC
- All EMS/OSH documents now in C-AD OPM
- Rails added at risky berm caps
- Correcting OSHA findings
- Ergonomic reviews increased
- All Tier 1 team members have 10-hour OSHA course
- NRTL program being implemented
- Replaced many PCB capacitors, especially at Linac
- Implementing improved fall protection program

FY06 Safety Solutions (S2) Proposals

- Steps at 2 o'clock and 6 o'clock valve box pits
  - $1000, PE to fund directly
- Lighting over machine shop at 1005S
  - $19,000; C-AD to fund directly
- Defibrillators at STAR and PHENIX - $4000

Paul Bergh

- C-AD FY 2005 Radiation Dose
- Radiological Compliance

Collective Radiation Dose

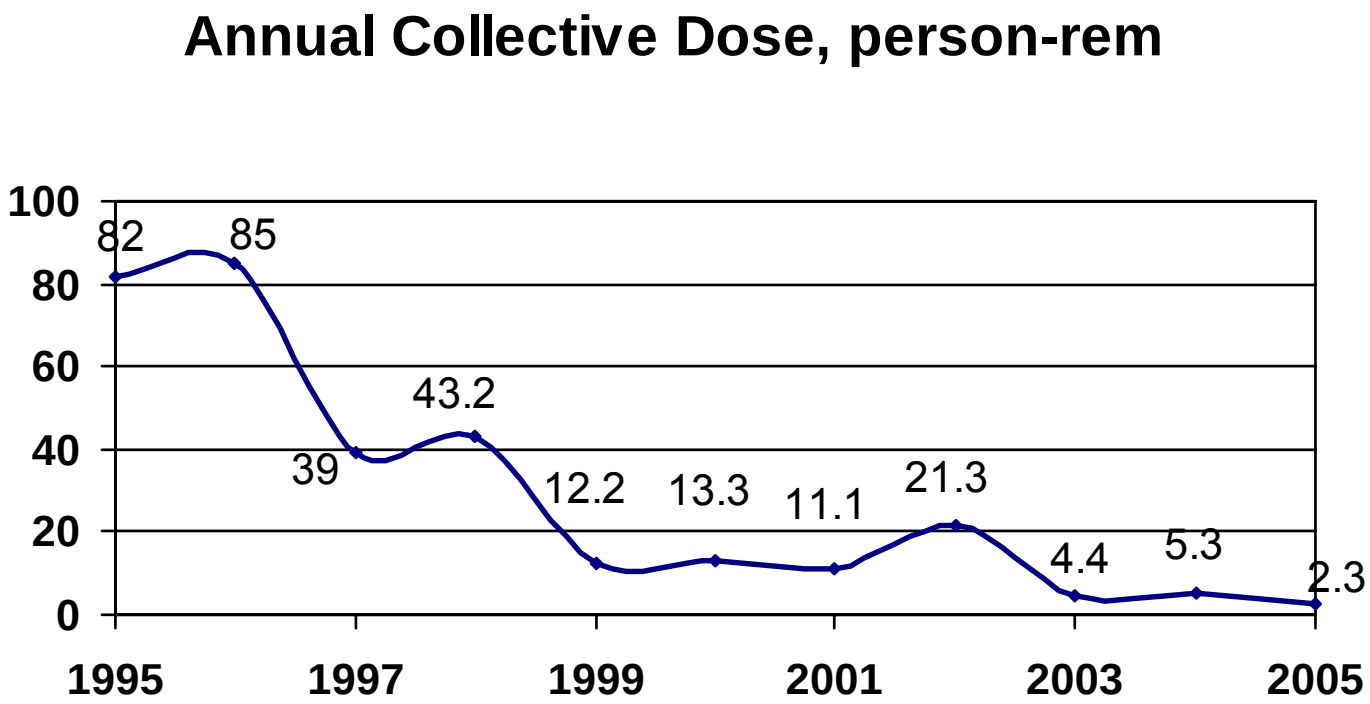
- FY 2005 C-AD Collective Radiation Dose

2.3 Person-Rem

Job Specific Radiological Work Permits

- **30 RWPs Issued**
- **5 RWPs Accounted for ~50% of Dose**
  - **Replace BLIP Water Tank Window** **528 mrem**
  - **Repair F-10 Leaking Gasket** **185 mrem**
  - **B-Line Disassembly** **126 mrem**
  - **Ship Radioactive Material from Inner Mongolia** **165 mrem**
  - **C-Line Disassembly** **70 mrem**

Comparison with Prior Years



Reason for Lower Collective Dose

- **Experienced Workforce**
- **Activation of Machine Components Significantly Less**
  - Not operating high-intensity protons
  - Dose rate surveys indicate Booster and AGS less than one-third FY02 levels

Individual Radiation Dose

Dose Range		Number of Workers
0 mrem to <100 mrem		55
>100 mrem to <200 mrem		3
>200 mrem to 300 mrem		2

Good Dose Distribution Among Individuals

Radiological Compliance

- **No Radiological Awareness Reports**
- **No Radiological Occurrence Reports**
- **No Non-Compliance Issues**

Mel Van Essendelft

EMS Audits and Compliance Audits

C-A, Laboratory and NSF EMS Audits

Environmental Services Compliance Audits

Environmental Monitoring & Performance

Air & Water Discharge Monitoring

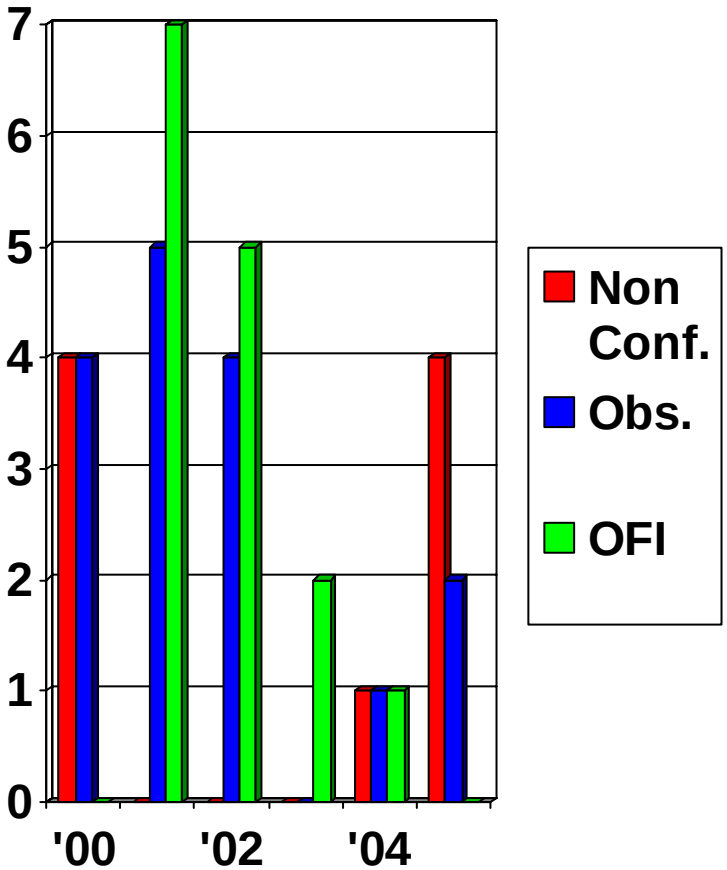
Spill Performance

Environmental Monitoring (RSS Program, g-2, BLIP)

Brookhaven Science Associates
U.S. Department of Energy

BROOKHAVEN NATIONAL LABORATORY

Internal EMS Audit by C-AD



’05 Audit Results

- 4 Non-conformances
  - OPM’s not reviewed within 3 year cycle
  - C-AD & SMD EMS web not integrated
  - Control of documents of external origin not specified
  - Effectiveness of corrective actions not evaluated
- 2 Observations
  - Competence and training awareness for contractors and service technicians not addressed in C-A EMS Program description
  - C-A EMS Self-Assessment plan completed but not officially released

NSF & Laboratory EMS Assessments

- Lab-level Assessment performed by BNL auditors:
  - 2 Observations
    - Some documents had not been updated to include SMD in EMS
    - 2 locations did not have current Sink Releasable Chemical Posting
  - 1 Opportunity for Improvement
    - formalize C-A waste technician training on Ludlum-19 Meter
- No NSF non-conformances, observations or recommendations

This is three years in a row of excellent performance

KEEP UP THE GOOD WORK!!

Compliance Audits

- NEPA Assessment
  - Lack of understanding of NEPA requirements by some BNL personnel
  - Need Procurement to ensure NEPA assessments are performed
- Environmental Monitoring
  - C-A has effective system for determining what monitoring is required

Results for Wastewater Discharge to Outfalls (Table 3-4)

Analyte		Outfall 002B (RHIC)	Outfall HN (RHIC)	Outfall HO (AGS)	Outfall HT-e (LINAC)	Outfall HT-w (AGS)	SPDES Limit	No. of exceedances
pH	Min.	6.5	7.1	NA	6.2	6.9	-	0
	Max.	8.4	8.6	NA	8.5	8.5	9	
Oil and Grease (mg/L)	Min.	<5	<5	NA	<5	<5	-	0
	Max.	4.1	<5	NA	<5	<5	15	
Hydroxyethylidene-diphosphonic Acid (mg/L)	Max.	<0.05	<0.05	NA	<0.05	<0.05	.5	0
Tolytriazole (mg/L)	Max.	<0.005	<0.005	NA	<0.005	<0.005	0.2	0

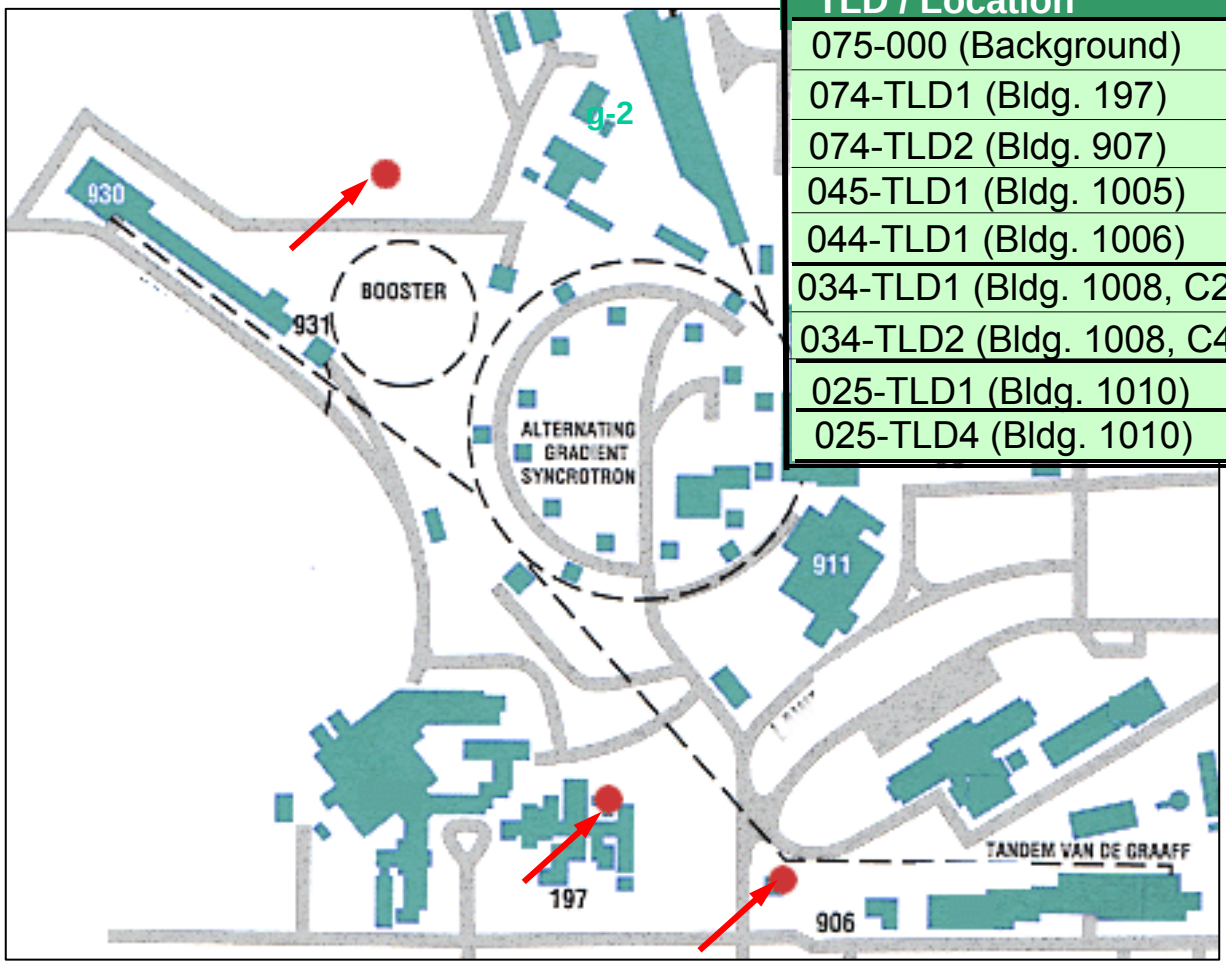
Water Quality Results for Recharge Basins (Table 5-5)

Location		Chlorides mg/L	Sulfates mg/L	Nitrate as N (b) mg/L
HN (RHIC Recharge)	Max.	63.9	20.3	0.64
	Avg.	39.9	13.1	0.46
HO (HFBR-AGS)	Max.	766	23.0	0.32
	Avg.	211.4	13.3	0.28
HT-e (AGS)	Max.	1330	36.9	1.02
	Avg.	358	23.2	0.54
HT-w (LINAC)	Max.	38.2	18.9	0.45
	Avg.	32.5	13.4	0.30
NYSDEC Effluent Standard		**500**	**500**	**10**

Radiological Results for Recharge Basins (Table 5-4)

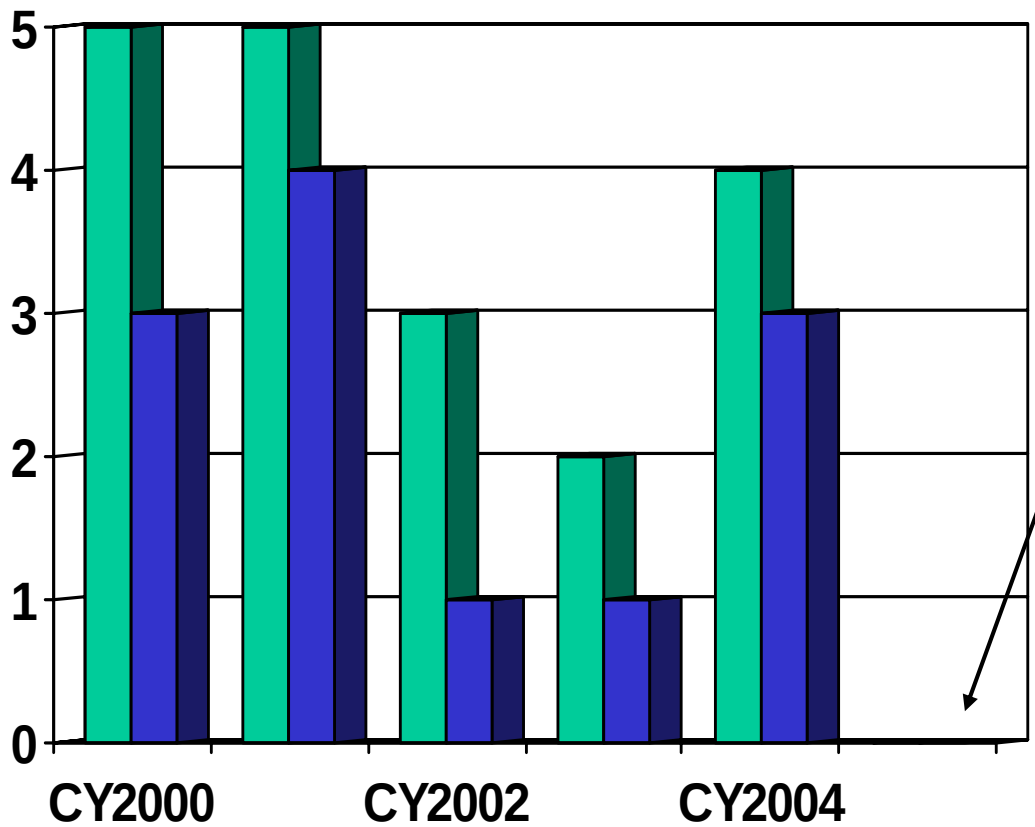
Basin		Gross Alpha (pCi/L)	Gross Beta (pCi/L)	Tritium (pCi/L)
HN	Max.	2.60 ± 1.30	7.90 ± 1.60	200 ± 120
	Avg.	1.02 ± 1.06	4.24 ± 3.03	68 ± 88
HO	Max.	< 1.20	3.60 ± 1.10	290 ± 180
	Avg.	0.20 ± 0.33	2.23 ± 1.45	105 ± 133
HT-e	Max.	< 31	< 18	190 ± 120
	Avg.	2.26 ± 3.13	7.64 ± 6.99	85 ± 111
HT-w	Max.	< 1.30	7.80 ± 1.60	< 200
	Avg.	0.19 ± 0.42	4.00 ± 3.37	75 ± 82
SDWA Limit		**15**	**50**	**20,000**

2004 Skyshine Results (mrem) (Table 8-1)



TLD / Location	QTR 1	QTR 2	QTR 3	QTR 4
075-000 (Background)	11.5	12.2	10.4	9.4
074-TLD1 (Bldg. 197)	17.4	17.1	17.8	20.0
074-TLD2 (Bldg. 907)	17.4	13.7	15.2	16.5
045-TLD1 (Bldg. 1005)	18.7	17.3	16.1	16.1
044-TLD1 (Bldg. 1006)	15.2	14.9	14.5	16.4
034-TLD1 (Bldg. 1008, C2)	18.0	15.9	15.6	18.4
034-TLD2 (Bldg. 1008, C4)	18.2	14.9	15.4	17.7
025-TLD1 (Bldg. 1010)	17.9	13.4	14.3	16.7
025-TLD4 (Bldg. 1010)	16.7	14.1	14.9	16.7

Spill Performance



CY 2005

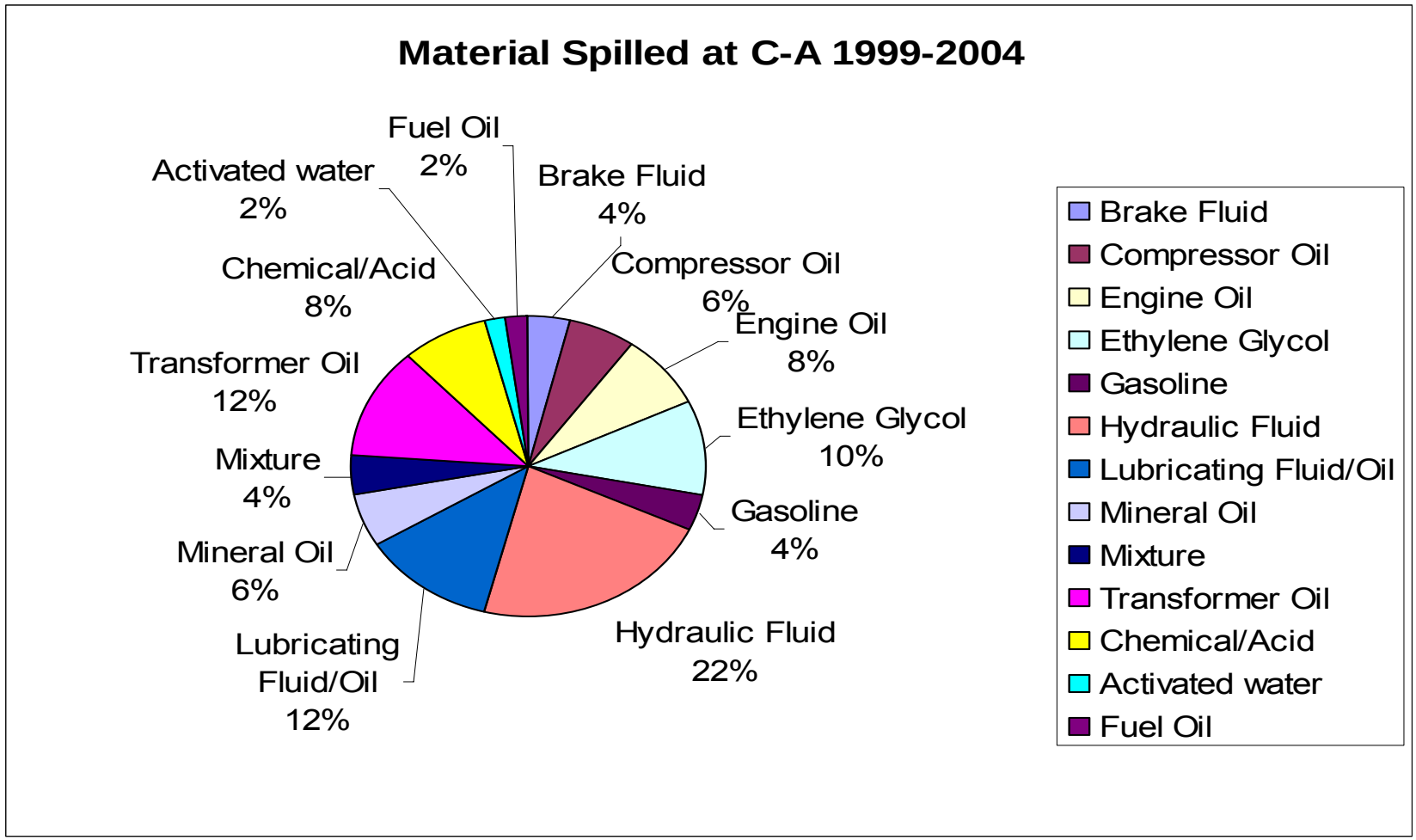
"0" Spills To Date

Non Reportable Spills

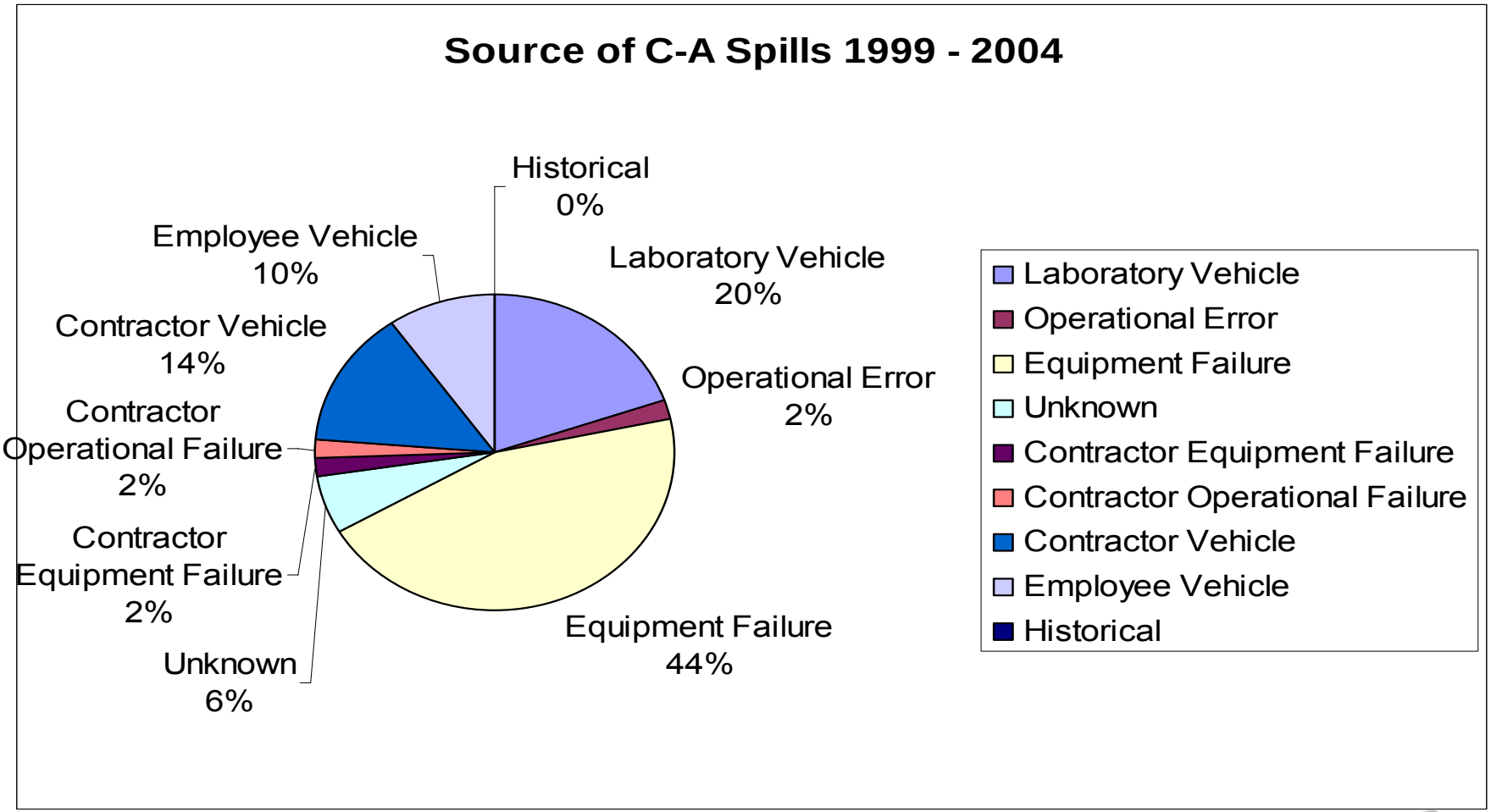
Reportable Spills

C-A Spill Goal <3 Total

Material Spilled



Source of Spills



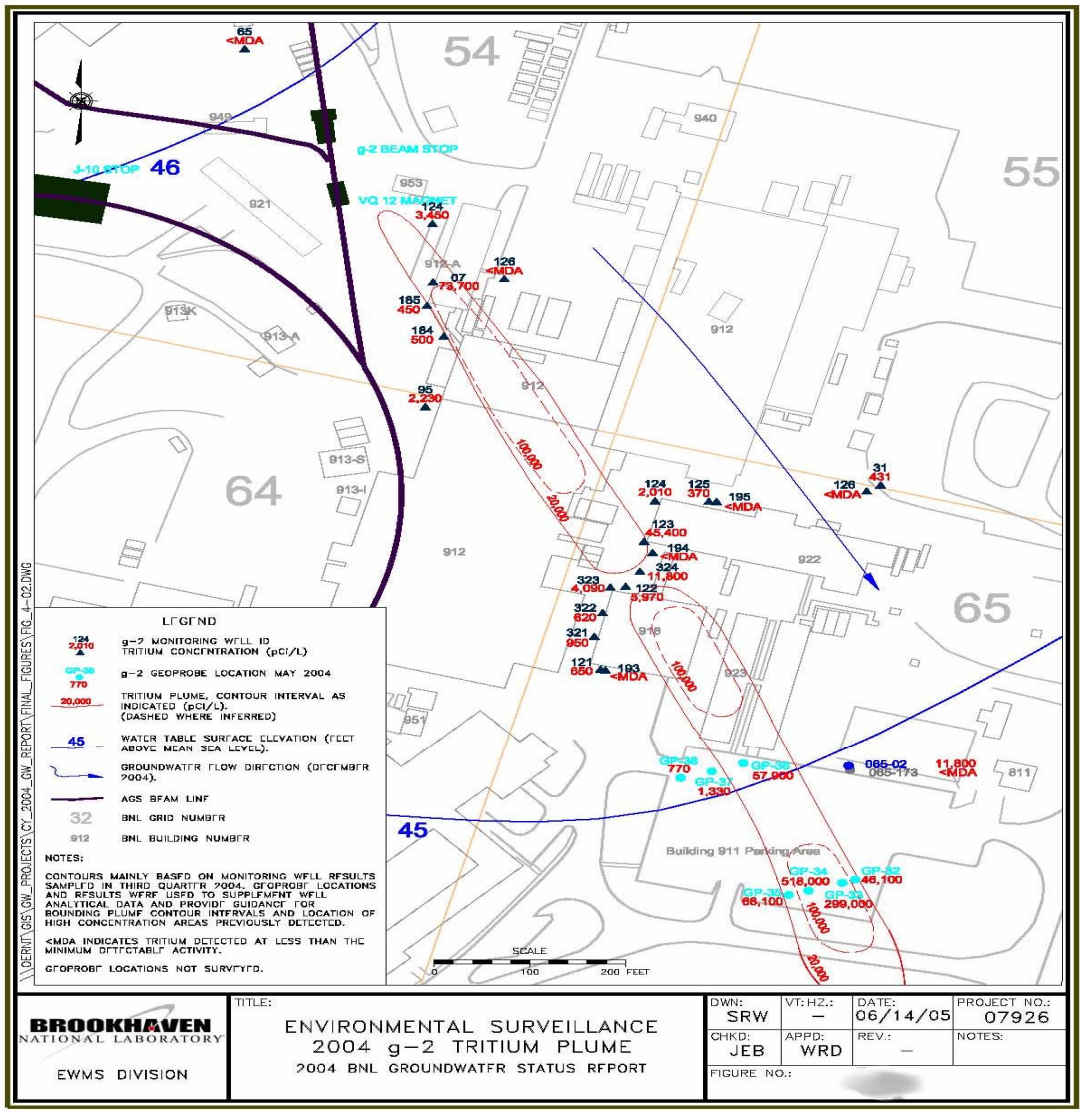
End of FY05 Run - Soil Sample Results

Location	Soil Na-22 (pCi/g)	Leachate H-3[1] (pCi/L)	Leachate Na-22[1] (pCi/L)
L20 BtA, 90°	1.34	2104	200
J10 AGS, 90°	13.2	20724	1967
Booster D6, 67°	0.174	273	26
Linac Blip Y, 90º	27	42390	4023
1006 Collimator, 90°	0	0	0
1006 Collimator, 67°	0	0	0

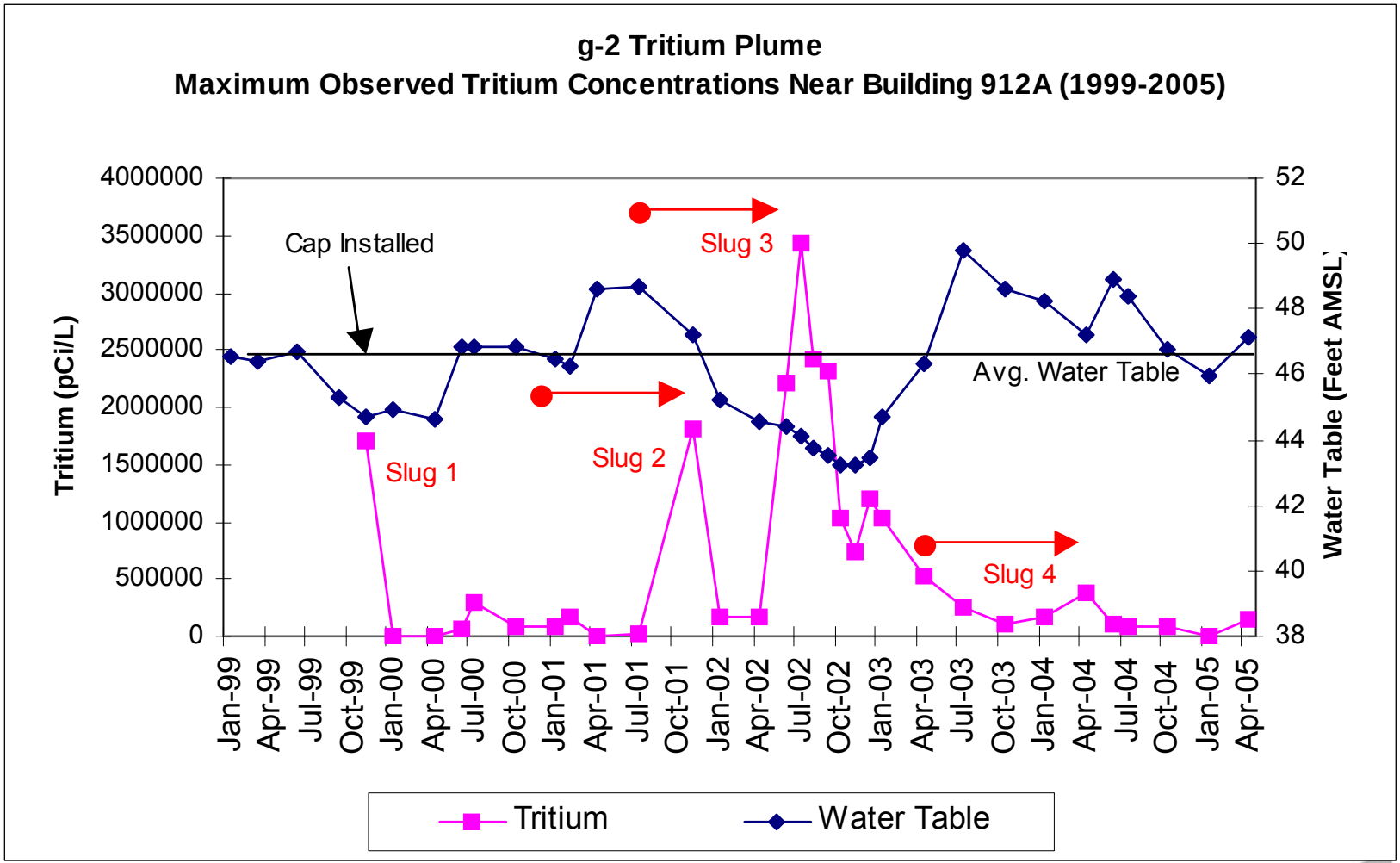
All areas are capped except the 1006 collimator.
DWS H-3 = 20,000 pCi/L
DWS Na-22 = 400 pCi/L

[1] Computed using current Subject Area Leachate Model dated 9/15/2000.

g-2 Tritium Plume



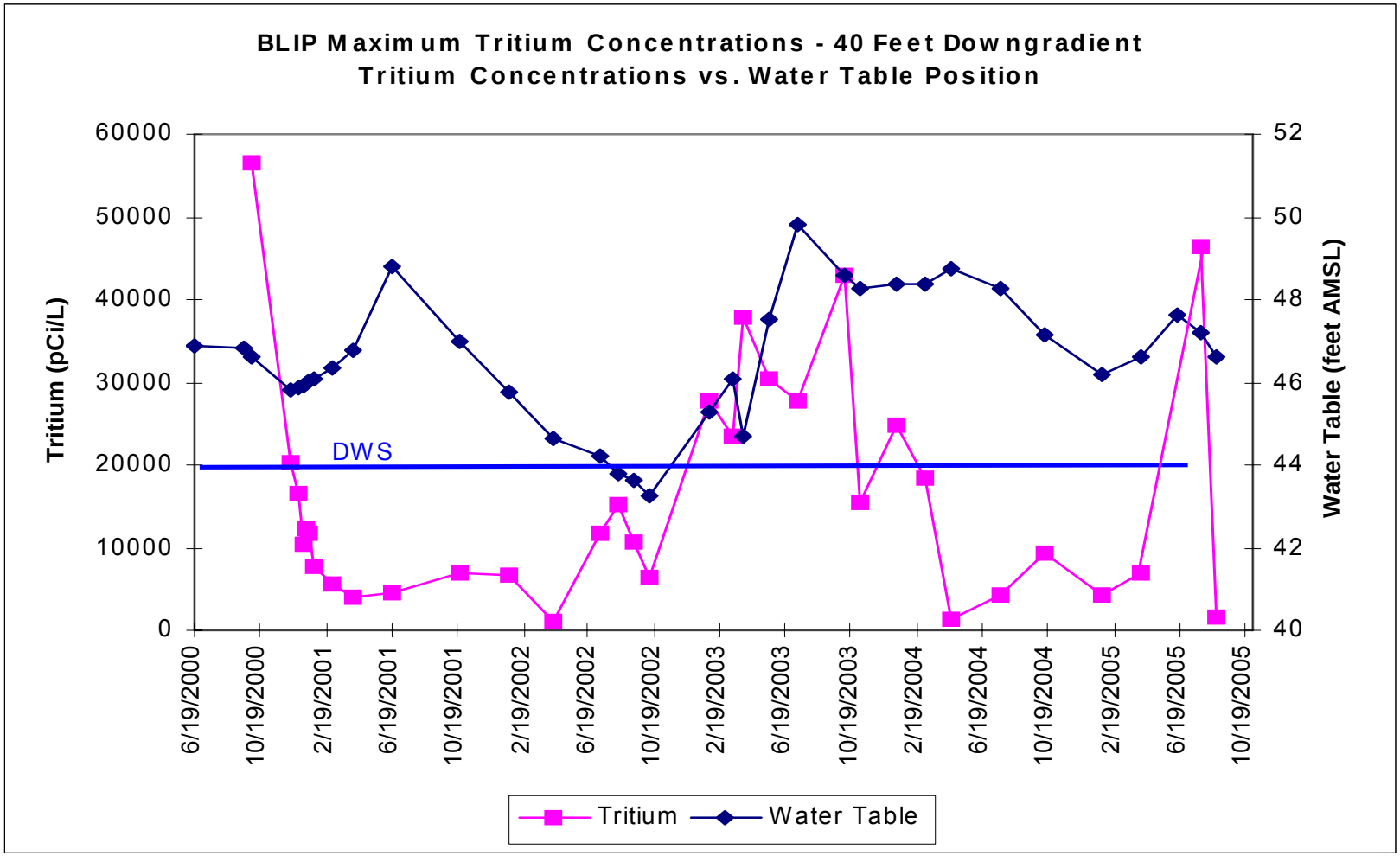
g-2 Tritium Plume



g-2 Focused Feasibility Study

- Collect additional data, June ’04 through Jan. ’06
- Prepare monitoring and response strategy by Dec. ’05
- Prepare and submit FFS to EPA/DEC by Mar. ’06
- EPA/DEC draft final approval by May ’06
- Public comment period through July ’06
- Prepare and submit Record of Decision to EPA/DEC by Oct. ‘06
- Preferred Alternative is *still* long-term monitoring and natural attenuation

BLIP Monitoring



Well Sampling Program Costs

FY	Cost
03	$72,600
04	$65,900
05	$69,900
06	Discussions to reduce sampling

Joel Scott

- Routine Waste
- Waste Minimization P2
- Legacy Waste Efforts
- Future Legacy Waste Efforts

Routine Waste

Waste Category	Actual	Comments
Hazardous/Industrial – Lab Pak	550 lbs	OSHA driven cleanups Below allocation estimate
Hazardous/Industrial - Barreled	35,000 lbs	Slightly above allocation but no chargeback
Low-level Radioactive – Solid	5200 ft^3	On allocation 3800 ft^3 of legacy waste
Mixed Radioactive and Hazardous	225 ft^3	Slightly above allocation but no charge back 196 ft^3 of legacy waste
Low-level Radioactive – Liquid	400 gal	This underage paid for small overages in other areas

Waste Minimization P2 Savings

- Sorting waste bags
  - Saved $7500
- Bulb crusher for activated lighting
  - Saved $100,000
- Decay in storage of air filters
  - Saved $7500
- Burned 420 gallons of oil
  - Saved $2000
- New can crusher from P2 funds
  - Saved $600
- P2 funding paid to dispose of 40 lbs of mercury components
- Total savings $120,000

Legacy Waste Efforts

- NP/HEP supported the following waste projects:
  - 4 Sea-land containers of *Inner Mongolia* components
    - Last of the Site Wide Material Disposition project waste removed
  - 8 bins of beam-line waste and 7 barrels of mixed waste
    - All from 912 cleanup
  - 128 large Linac capacitors and 90 medium capacitors
    - New capacitors purchased, old capacitors sent to waste
  - 5 bins of lead brick and sheets from beam-line cleanup

Legacy Waste Efforts

- Crestwood removed metals and tanks at rail yard, 960, 919, 628, and RHIC yard
- Building 628 returned to PE
- Aerosol can puncture system
  - Allows most aerosol cans to be punctured, drained and discarded as recyclable metal
- Disposed of 40 lbs of mercury components

Future Legacy Waste Efforts

- Purchase last half of large Linac PCB capacitors
  - Send replaced capacitors to waste
  - Small capacitors to be completed next year
- Continue with FES Division cleanup of B912
- Continue *Inner-Mongolia* waste removal
  - Rearrange area for better storage
  - Include 6 magnets from B209
- Purchase and replace B928 PCB capacitors

Summary of OSH and E Costs

FY05 Management Systems Maintenance

▪ OSH and environmental records	0.2 FTE
▪ Corrective action tracking (ATS)	0.5 FTE
Total	0.7 FTE

FY05 Pollution Prevention and OSH PPE

▪ Tritiated water-system upgrades	$300,000*
▪ Aerosol can crusher	$2000
▪ Personal protective equipment	$400,000
Total	$527,000

*$175,000 carryover to FY06 to help pay for AGS Fast Pulse Quad piping elimination

FY05 Clean-Up

▪ HEP legacy waste	$900,000
▪ Routine waste	$2,500,000
Total	$3,100,000*

*($300,000 not spent yet)

Fines/Violations

- None

FY05 Injury/Illness Costs

- Direct costs of $25,026
  - Four Workman's Comp Cases ranged from $141 to $22,415
  - Down from $82,050 in FY04

FY05 OSH and E Monitoring

▪ New g-2 geo-probes and samples	$10,000
▪ Routine well sampling and analysis	$69,900
▪ OSH measurements (noise surveys, industrial hygiene and rf measurements, etc.)	0.2 FTE
Totals	0.2 FTE $79,900

FY05 Backward-Oriented Measures

▪ Performance indicator program	0.1 FTE
▪ Critiques	0.1 FTE
▪ Injury/Illness investigations	0.1 FTE
▪ Occurrence investigations	0.2 FTE
▪ Tier 1 inspections	0.2 FTE
▪ NSF, OSHA and other audits	0.4 FTE
▪ Internal OSH / EMS Audits	0.5 FTE
Total	1.6 FTE

FY05 Future-Oriented Measures

▪ Management Review	0.1 FTE
▪ WOSH Committee	0.1 FTE
▪ BNL 18001 Team	0.1 FTE
▪ Safety Week	0.1 FTE
▪ ASSRC, RSC, ALARA, ESRC reviews	0.3 FTE
▪ Tier 1 and OSHA compliance improvement reviews	0.1 FTE
▪ Review of job and facility risk assessments	0.5 FTE
▪ Review of environmental process evaluations	0.1 FTE
▪ Annual OSH/EMS training	0.1 FTE
▪ Annual review of OSH/EMS management plans	0.1 FTE
▪ Annual review of OSH/EMS controls	0.1 FTE
Totals	1.7 FTE

Technical Support

▪ Environmental Coordinator	0.5 FTE
▪ Environmental Compliance Rep.	1 FTE
▪ Hazardous Waste Technician	1 FTE
▪ Work Planning Coordinator	0.5 FTE
▪ Tier 1 Coordinator	0.5 FTE
▪ ESH Coordinator	0.5 FTE
▪ Training Coordinator	0.5 FTE
▪ Procedures Coordinator	0.5 FTE
▪ Radiological Control Techs and Super	8.0 FTE
▪ Facility Support Representative	1.0 FTE
Total	14 FTE

FY05 Cost Summary

Category	FTE	Expense
▪ Management Systems Maintenance	0.7	-
▪ Pollution Prevention and OSH PPE	-	$527,000
▪ Waste Costs	-	$3,100,000
▪ Fines/Violations	-	-
▪ Injury/Illness	-	$25,000
▪ Monitoring	0.2	$79,000
▪ Backward-oriented measures	1.6	-
▪ Future-oriented measures	1.7	-
▪ Technical Support	14	-
▪ Total	18.2	$3,731,000

Summary of Management Review Presentations

- OSH management system is mature and part of C-AD culture
- E management system is mature and part of C-AD culture
- Most contract performance objectives in science and technology are met
  - Injury rates still a bit too high
- Continual improvement noted in:
  - Worker involvement
  - Electrical safety
  - OSHA compliance
  - Fire protection but speed of improvements is slow
  - First aid and sports injury reduction
  - Pollution prevention
  - Waste minimization
  - Legacy waste removal
  - Combining and streamlining E and OSH management systems

Senior Management Evaluation

- Purpose: identify improvement actions and assign responsibility and resources to implement

Management Question 1

- Are the OSH/EMS/SA programs effective in achieving policy commitments?
  - Compliance?
  - Pollution prevention?
  - Injury/illness reduction?
  - Community outreach?
  - Clean-up?
  - Continual improvement?
- Issues
  - Continue to archive data on activated soils
  - Continue to remove PCB capacitors at Linac and Building 912
  - Continue to repair Building 912 roof
  - Continue Safety Week to obtain feedback in FY06
  - Continue OHSAS 18001 and ISO 14001 registrations

Management Question 2

- Are programs effective in achieving the objectives and measures?

- Issues
  - Evidence points to successful achievement of most targets
  - Continue to reduce injuries toward zero
  - Improve pre-job briefing program to reduce errors and injuries

Management Question 3

- Are the OSH/EMS/SA programs adequate in terms of:
  - Identifying significant environmental aspects and impacts?
  - Identifying significant occupational safety and health hazards?
  - Resource allocation?
  - Information systems?
  - Organizational issues
    - staff expertise?
    - procedural requirements?
- Issues
  - ESHQ resources are at minimum to support expectations, need to increase productivity
  - Need to improve fire protection funding
  - Need to increase productivity by streamlining management systems
  - Continue to improve housekeeping programs
  - Need to better define C-AD/SMD ESHQ integration

Management Question 4

- Are the objectives and measures for OSH and E related programs suitable in terms of:
  - Environmental impacts, occupational hazards and current conditions?
  - Concerns of stakeholders?
  - Current and future regulatory requirements?
  - Business interests?
  - Technological capability?
  - Internal organizational or process changes?
  - Should additional measures be established?
- Issues
  - Need performance measures to speed fire protection improvements
  - Need to establish targets for preparation for ISM review
  - Need to coordinate and closeout OSHA violations with PE
  - Need to comply with 10CFR851 if enacted
  - Need to review Skill of the Craft jobs to assure they are low hazard
  - Need to address removal of aging cable in AGS
  - Need to draft ERL and EBIS authorization documents

Management Question 5

- Recommended revisions to:
  - OSH policy and commitments?
  - Environmental policy and commitments?
  - Self-assessment policy and commitments?
  - Objectives and performance measures?
  - Elements of OSH?
  - Elements of EMS?
  - Elements of SA?

- Issues
  - Continue to streamline SBMS management systems
  - Continue to re-enforce worker involvement including C-AD self assessments